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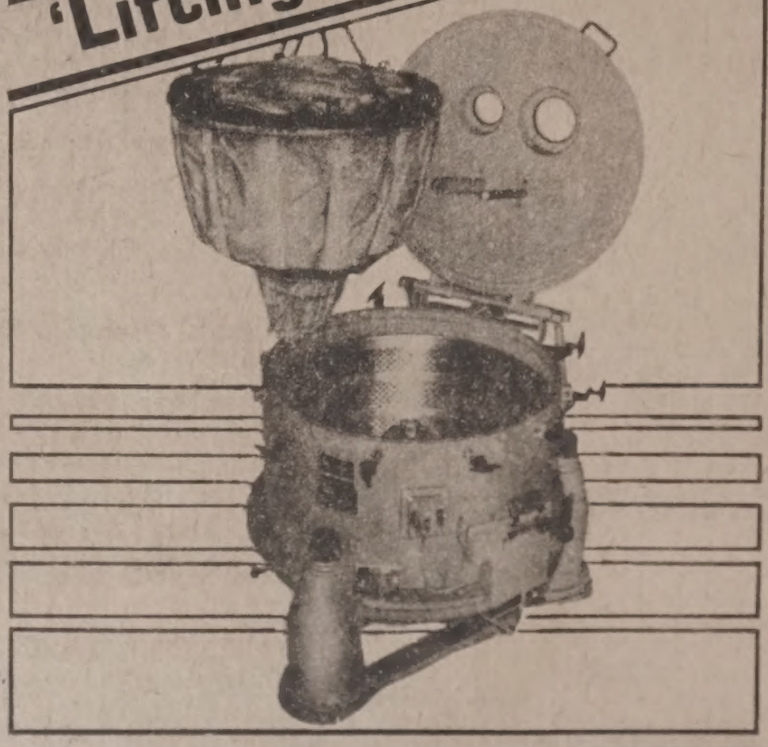

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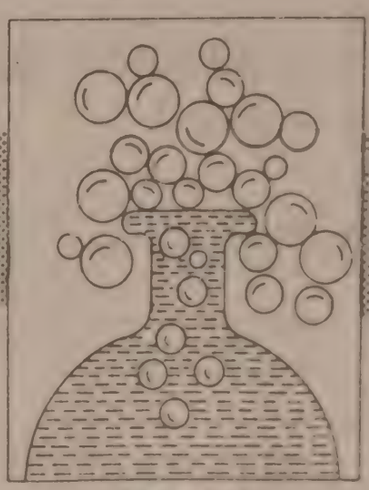

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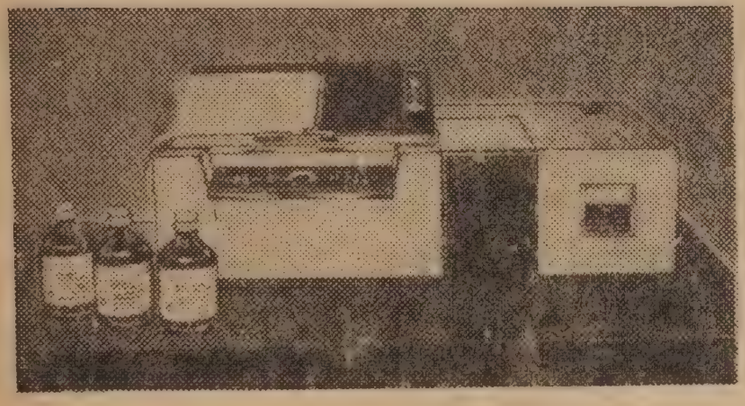

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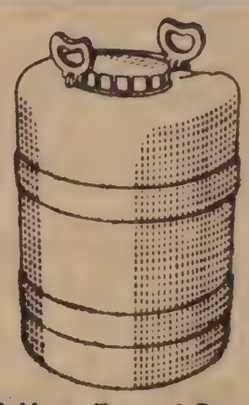

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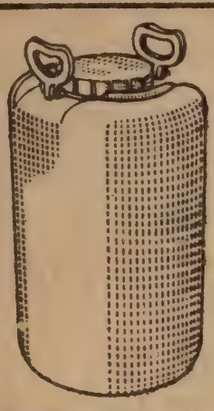

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– 6" Cap

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6 Kgs. Square Jar
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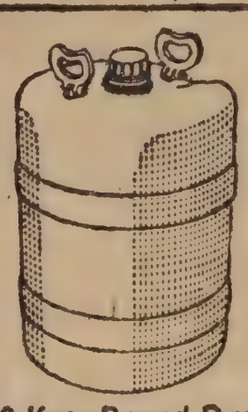
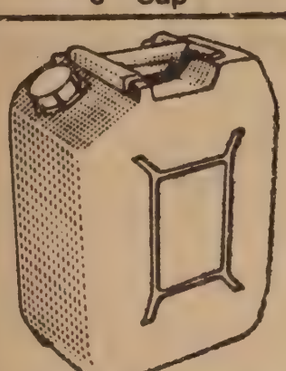
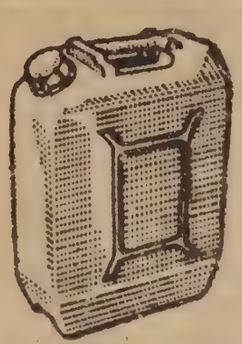


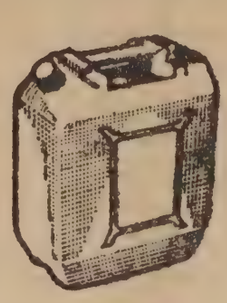
50 Kgs. Round Drum
– 2" Cap



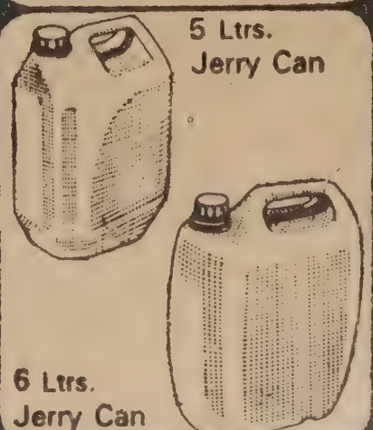
30 Ltrs. Jerry Can
Stackable



20 Ltrs. Jerry Can
Stackable



10 Ltrs. Jerry Can
Stackable



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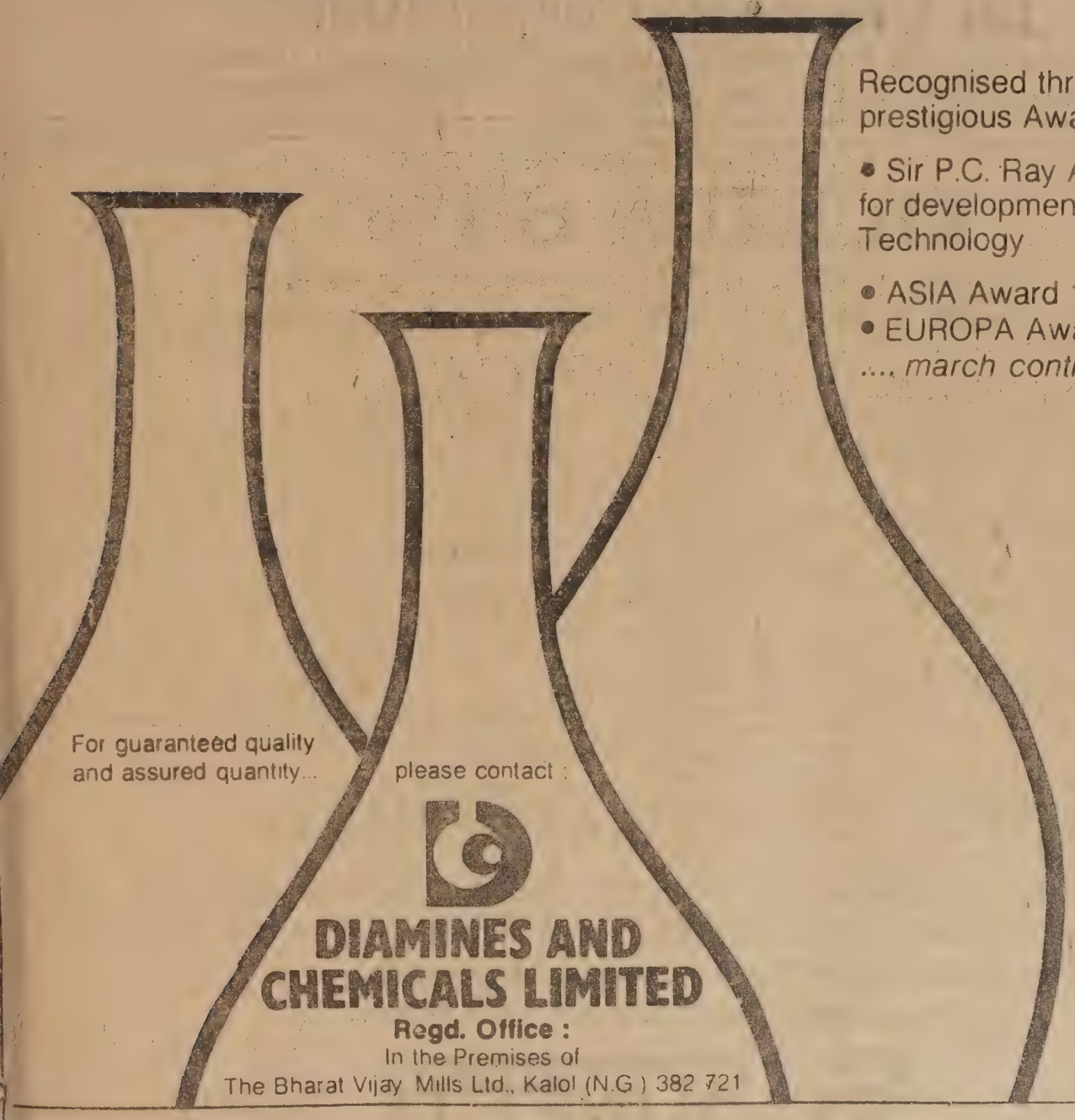

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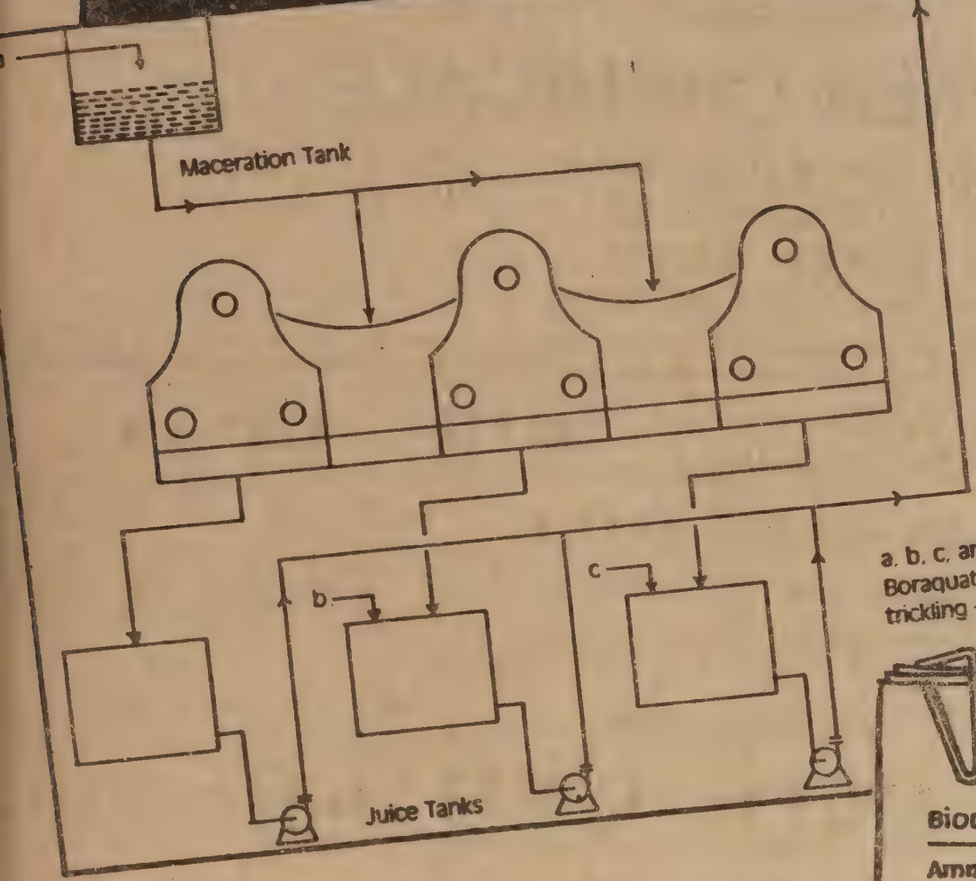

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HERALDING THE 21st CENTURY - 23

Artificial Intelligence - the Formidable Frontier

Man in his never ending struggle to imitate and improve upon nature, first invented the machine and now is trying to impart intelligence to the machine.

Artificial intelligence is the science of making machines do things that would require intelligence if done by man. In personal behaviour, intelligence is associated with such concepts as 'purpose' and beliefs. Can these be created or induced in machines. Artificial intelligence is the field that aims to understand how computers can be made to exhibit intelligence.

The computer, to which artificial intelligence is transferred, is capable of understanding only direct speech or instructions and cannot face leading or loaded questions.

The statement "The door is open" can only have a direct simple meaning to the computer while the human brain can interpret it as the door being kept open for negotiations. Similarly the computer cannot distinguish between a cricket bat and the nocturnal flying 'mouse'.

In the early days of the computer there were a number of jokes about the translation abilities of the computer. The word went round, that it translated symbolic statements mechanically. Thus the poetic expression "out of sight, out of mind" became a "blind lunatic" and the expression "the spirit is willing but the flesh is not yielding" got translated as "the wine is good but the meat is bad". In Engineering parlance the expression "hydraulic ram" became a "Water goat". In banking cities the computer's insistence for a cheque for "Zero pound" is still common.

Speech understanding was the goal of a special project, in the sense that systems were to be judged on whether they responded correctly to their input by giving the right answers to the question rather than whether they correctly identified all the words in the utterance. The vocabulary and set of allowable sentences were carefully chosen to minimise confusion or double meaning. While tall claims are being made about capabilities, speech recognition with or without understanding is still restricted to distinctly artificial conditions. There are many problems associated with back ground noise, especially of other speakers and with variations in recording conditions, voices, where basic research still needs to be done before systems can move confidently into the real world.

The computer vision still offers the most formidable challenge in laying any claim towards the achievement of real artificial intelligence. The input to a computer vision system is normally a discrete image composed of a matrix of integers from within a finite range, each of which represents the light intensity over a small rectangular picture element commonly known as 'pixel'. The amount of information contained within a range is a function of the number of pixels and the number of distinct intensity levels available. Colour pictures are normally represented using three seperate images, one to record the intensity of each component colour (red, green and blue).

The current generation of applied computer vision systems are generally inflexible and often require carefully controlled lighting and a restricted environment for example an object of interest may have to be presented in isolation against a uniform background. The challenge to develop techniques leading to compute vision systems which perform a wide varety of tasks working from images of everyday scenes has still to be met.

Another problem is that the available stock of three dimentional representational techniques does not provide an obvious method for describing generic classes of objects, such as trees or Alpine landscapes as opposed to mountain landscapes in other parts of the world.

A lot remains to be understood about how to combine information about a scene from different sources of information present in the same picture. For example, if the texture distribution and binocular disparity gives rise to conflicting indications of the surfaces it cannot be remedied.

Robotics is the intelligent connection of perception to action. The key words in this sentence are "intelligence" and "perception". Normally robotics is thought of as simply the

connection of sensing to action using computers. The typical sensing modalities of current robots include vision, force and tactical sensing, as well as proportionate sensing of the robot's internal state. The capacity of action is provided by the arms, grippers, wheels and occasionally the legs.

The software of modern commercially available, robot systems, includes a variety of functions; it performs trajectory calculation and kinematic translation, interprets sense data, executes adaptive control through conditional execution and real time monitors, and supports programme development. It does most of these tasks quite well, particularly those that pertain to computer science; it does others poorly, particularly perception, object modelling and special reasoning. Insofar as robotics is the intelligent connection of perception to action, artificial intelligence is still a challenge to robotics.

To be intelligent, robotics programmes need to be able to plan actions and reason about these plans. The crux of the problem is whether artificial intelligence has developed the required planning technology. All too often, artificial intelligence planning and reasoning systems have only been exercised on a handful of toy samples.

In summary, robotics challenges artificial intelligence by forcing it to deal with real objects in the real world. Techniques and representations developed for purely cognitive problems, often in toy demands, do not necessarily extend to meet the challenge of the real world.

The concept of the expert systems arose in the 1970's, when artificial intelligence researchers abandoned or postponed, the quest for generally intelligence machines and turned instead to the solution of narrowly focussed real world problems. Thus the expert system is one of the first examples of applied artificial intelligence and expert system techniques have spread out far beyond the confines of the research laboratories in which they were devised.

A typical expert system has four major components (1) the knowledge base, (2) the inference engine, (3) the acquisition module and (4) the explanatory interface. More and more organisations are finding that knowledge engineering techniques allow them to tackle problems that could not be solved easily (or at all) with the conventional methods.

One of the major bottlenecks of expert systems construction is the issue of knowledge extraction which is costly and ad hoc in its present form.

Machine learning, tho..gh neglected for the best past of twenty years, is one of the core problems of artificial intelligence, because it holds the key to many other capabilities. During the last twenty years, there has been an increase in the use of concepts taken from computer science for modelling physiological processes.

The latest memory models begin with a consideration of brain, how it works and how it is organised. The model builders then construct their theories. In one model, the brain is approximated to a set of binary elements - abstract neurons which are either on or off - can be used. A particular type of neurons can be used as a threshold logic unit (TLU). Psychologists have used the information processing technique to explain various phenomenon associated with human memory but more recently psychologists are rejecting this central concept in favour of more hardware oriented models. The human brain is built up of proteins and nucleic acids, a result of 3500 millions of years of evolution by hit and m mutation and by the force of natural selection operating und the push of necessity for survival. The computer is built solid state electronic devices, as a result of 4 decades of pu poseful development by human beings operated by hum beings with the push of producing something to serve (society) more efficiently. The computer and human brai both have memories, each functions with remarkable ef ciency in some respects but while the area of functioning the computer is limited to a very few areas the brain is ve satile over a much wider range of topics with varying eff ciences. Artificial intelligence is limited both in scope an depth to a limited number of topics.

Intelligence has never been defined in a way which is inde pendent of the people who wish to be called intelligent. is possible to produce simple definition of intelligence ari ing from the existing work on artificial intelligence witho reference to any creature which exhibits intelligence.

Artificial intelligence is not about replicating human ment state any more than building aircraft is about replicating bird An aircraft is similar to a bird only in the respect that bot have the capability of self-sustaining flight. An intelliger artefact is similar to the brain only in the respect that bot can perform activities requiring intelligence.

One of the many effects of the industrial revolution ha been the reduction in human society of the need of craft manship i.e. the capabilities to do a manual task skilfully Thus the skills which were the property of the people hav been taken away from them and invested in machines. The burden of production has been put in machines instead o men. A parallel is now being sought of investing these machines with some intelligence.

The questions that confront us are - what will be the nature of these drastic changes engendered by artificial intelligence on Society. At the end "will it be paradise regained or wil it be an Orwellian nightmare" - Most likely neither, but cer tainly the potential exists for both tendecies in some measure

There will be greatly increased leisure time as a result o new technology but will there be increased opportunities for utilising that leisure and at what cost? One common saying is "people in and out of work will have time to devote to each other; which freedom do they not enjoy today" - another view refers to man's freedom from drudgery.

Another view emanating from the 3rd World countries runs as under: "The world is filled with need. It is premature to worry about robots eliminating work as long as there exists such overwhelming problems as providing food and medical care for millions of people living in desperate poverty."

These are enough indications which confirm that human intelligence and machine intelligence are different. If current research on artificial intelligence is any guide to the future, then the partnership to super intelligence might be comprised of global knowledge and broad association abilities of human beings together with the exhaustic rigour and depth of machines in limited domains.

The challenges before artificial intelligence are formidable and chances of their being overcome in the coming century are by no means bright. Man can confidently hope to continue to be the master of machines and the computer as well.

-- T.P.S. RAJAN

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DAP import preferred?

One report mentions that the Government is expected to nport 23 lakh tonnes of DAP in the current year as against lakh tonnes in 1988-89. The reason is the non availabilty nd high prices of phosphoric acid which is the base for most f India's DAP production. The high costs of phosphoric acid n bulk tankers reflects on the price of DAP and adds to the ubsidy on fertilisers. It is felt that it is cheaper overall to mport DAP than the cost to make it. Even compensation for dle capacity would be possible though this may not be the ight approach. There was a lot of enthusiasm on phosphoric cid imports - in any case we are obliged to import rock phosphate and sulphur to make it. But a sudden shift in the relative prices of rock phosphate and phosphoric acid has altered he equilibrium and additionally the phosphoric acid producers in the Gulf prefer to go further to MAP or DAP than sell he acid. There has already been a loss of production of 1.2 lakh tonnes of DAP per month due to non availability of phosphoric acid. Paradeep Phosphates Ltd. is also in trouble inspite of its being a joint venture with Naarvu which is an exporter of rock phosphate. The cut in phosphoric acid will also cut in the offtake for ammonia required for DAP production.

All told the situation is rather unfortunate. The main phosphoric acid producers of the world are said to have formed a cartel to dictate prices, with the Morocco Company as the leader and Phoschem of USA as a partner. Prices are said to have shot up to $512 per tonne, over 40% higher from 1988 levels. On the other hand, DAP is said to be priced at $240-250/tonne, about 20% above the requirements of phosphoric acid cif import to make a tonne of DAP. Government is active in negotiations for a fair settlement and Moroccan producers also have to face difficulties in storage when the acid is not readily sold. India's DAP demand is estimated at 5 million tonnes and production capacity 2 million tonnes. Hence a level of imports cannot be avoided and the Paradeep plant will be better placed to go out full blast with imported rock phosphate. Sulphur prices are also at a peak adding not only to the problems of phosphoric acid producers but also of the numerous SSP producers.

Energy usage for Ammonia production

Energy is a major input in the production of ammonia from hydrocarbon feedstocks. It is about 25 years since the use of centrifugal compressors were adopted and resulted in a dramatic fall in energy use. Subsequent years saw the capacity levels of single ammonia to 1300-1500 tonnes a day with resultant fall in costs and energy use. Natural gas usage also cuts down the energy use as compared to the other feedstocks. Now recent years have seen advances in catalysts chemistry and reactor designs to further reduce the energy input to counter the rise in price of natural gas - an average of $1.65 per million btu in 1987. Some plants built after 1980 have a reduced energy need at 25 mill. btu per tonne of ammonia (against 33 mill. btu earlier). The goal is 21 mill. btu.

There are improvements at every stage of the process -- production of hydrogen, purification for removal of CO and CO_2, and in the synthesis step. Except the removal of CO_2 all other steps are catalytic and the present day catalysts are vastly superior with lower temperatures of use. Apart from catalyst composition, the most important step is in the design of pellets - with holes to improve heat transfer and longer life and reduce pressure drop, besides higher surface area and activity. The CO shift reaction using copper-zinc catalyst has double the life time and increased resistance to sulphur. The synthesis catalysts have also been improved with what is called ICI's AMV process showing the best performance with lowest feed and fuel consumptions.

Hydrogen purification step is another key area and cryogenic separation claims advantages. The pressure swing absorption system using molecular sieves is common and an improved version called Hysin Polybed PSA requiring 43% less energy is available.

The Benfield process using hot potassium carbonate is now available at lower heat consumptions through use of mechanical vapour compression. Selexol using polyethylene glycol dimethyl ether is claimed to be as efficient in energy, besides another using methyl diethylanolaniline based solvents. Many of these newer methods are said to be good for retrofit of existing plants.

The centres of efficiency are in the converter and the two bed horizontal convertors for synthesis loop with novel

internals claim 25% reduced energy use. Kellog is the pioneer in intercooled horizontal design configuration. Haldor Topsoe are also leaders in reactor design with radial flow catalyst bed while Foster Wheeler have improved the vertical reactor design with stacked catalyst beds. Above all, on line optimiser computer control system is used and newer advanced digital control systems available from many parties.

India has relied on Haldor Topsoe for the latest designs of ammonia and has made it a common feature of most of the new gas-based plants leaving no room for alternative equally efficient systems. The catalyst import is a tie up but perhaps the several plants using one system and one source will help the production of the proprietor 'catalysts'. But there is another important development by ICI termed LCA process (Leading Concept Ammonia Process) which claims equal efficiency levels in ammonia plants of 450 tonnes per day. The concept splits the synthesis gas and ammonia generation plant away from the utilities section. Two such units are already working in their UK plant. The natural gas is mixed with recycle hydrogen and heated and desulfuris then cooled and passed into a feed gas saturater where comes in contact with circulating hot process condens before mixing with more steam to give a 2.5 ratio for refor ing. The primary reformer is a 200-250 degree Celcius a 30-45 bar and a secondary reformer operates with excess a The reformed hot gases provide heat exchange for prima reformer for heat optimisation. CO conversion is in an is thermal water cooled low temperature shift converter at 2 degree Celcius -- only one pass. After cooling and PSA remove excess nitrogen, carbon dioxide and inerts, the g goes for methanation and the synthesis loop using a low pre sure iron based catalyst. The hot gases are cooled generati steam at 60 bar and then ammonia is vapourised and se arated before recycle. ICI claims only 7 G cal/ton ammoni There are equal prospects for 450 tonnes per day plants (es mated cost of $54 million) and a third of capacity of the mar units now in operation in India. There is a need to have fresh look at the plan for creation of additional ammon capacities in India.

Membranes for Biochemicals

Membranes for separation is an ever expanding area of recent years, particularly of gas separations. The technique is now being extended to liquids also such as proteins from cell culture. Separations and purifications are a big section of cost of biological products and membrane separations could be of promise.

Monsanto were the pioneers with their "prism" separation for hydrogen recovery and other areas. Permea Inc., is a subsidiary of Monsanto specialising in these separations and supply of the necessary materials. The two who developed the prism separator are in top posts in Monsanto divisions concerned with separations. Besides Permea, there is another subsidiary Kinetic Inc formed to develop and commercalise membranes for liquid separations - laboratory, clinical or process equipment for production and purification of biologicals in the biotechnology, pharmaceutical and medical markets. The special separation methods are worthwhile for high value products of several dollars/gm. upto a thousand.

Kinetic have developed Network cell and culture system based on their Hybrinet hollow fibre membrane reactor. This combines the functions of an incubator and a small sterile enclosure with a hollow fibre bioreactor. The parts mimic the functions of a heart (pump), a lung (gas exchange module) and a cell tissue (reactor). These can be autoclaved. The membrane acts by removing a selected metabolised product from solution and the artificial kidney removes all was.e.

The culture of cells is tedious and time and labour and equipment intensive particularly for animal cells or tissues. Special techniques are required and some mammalian cells do not proliferate in suspension but require surface support to synthesise proteins. The Kinetic reactor uses hollow fibre based on perfusion and modelled on capillary systems foun in vivo. Perfusion enables cells to be continously removed Cell levisites densities could be maintained at higher level - as much as 10^8 per mi. Cells in the hybrinet reactor pro duce 200 mico gm. of monoclonal antibody from 500 ml c conditioned medium and the recovery is also much highe

Protein seaparators based on hollow fibres ion exchang systems are also expected. The ion exchanger consists o charged molecular groups covalently attached to an inactiv support. Ion exchanger containing positive groups binds b electrostatic interaction and this becomes anion exchanger while an exchanger with negative groups becomes a cation exchanger. The counter ions that are bound can be replaced with others including proteins, similar as with chromatog raphy. Traditionally ion exchange chromatography has used small hydrophilic beads in columns as supports. Here, a dead end hollow fibre is the support matrix with fibre walls o microporous polymers - polysulfone polymers created in a special process with hydrophilic polymers. Protein recover ies are claimed to be very high. The anion version contains dimethylamino ethyl group while cation type has a sulfonic group. The units are called Isonet system and the method can be called "Permeography".

If the membranes themselves can be made catalytically active there is scope for reactions in addition to separation --a future possibility. The combination of selective chemica reaction with the ability to limit reactant participation and simultaneously remove products would be a prize achieve ment in the field of bioproduction of functional molecules in vivo.

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Refineries hike benzene price

Refineries have jointly increased the price of benzene from Rs. 6,484 to Rs. 7,600 per kilo litre (exclusive of taxes) with effect from May 15. This is likely to push up raw material costs of industries as diverse as textiles, pharmaceuticals, plastics, dyestuffs, detergents, pesticides, plywoods and leather.

A price increase at this juncture has surprised sections of the industry who were naive enough to think that the commissioning of the 87,000 tonnes per annum benzene plant of Cochin Refineries Ltd. (CRL) would lead to competition among the refineries.

The major producers are Bharat Petroleum Corporation Ltd. (BPCL) with 98,000 tpa capacity and Indian Oil Corporation Ltd. (IOC) with 48,000 tpa capacity.

The price rise, according to refinery sources, is the outcome of "strong representations" made by CRL management to IOC for a higher price for its material on grounds of higher investment it had incurred.

Though refineries officially deny it, it is learnt that both IOC and BPCL were initially opposed to a price increase. Finally IOC took the decision and BPCL fell in line.

Benzene falls outside the list of petroleum products whose prices are determined by the Government. Refineries are free to fix competitive prices. Charging a uniform price on the basis of CRL's costs would lead to "unintended profits" for IOC and BPCL and is unfair to consumers who are forced to pay more because of one producer, industry sources in Bombay said.

Refineries deny the charge saying that operating costs have gone up since the last price revision in 1985, rendering the existing price unremunerative. This claim is hardly convincing as the price increase followed a formal request from CRL for higher price, Duty on naphtha was increased from Rs. 25 to Rs. 60 per k.l. for April, which works out to an increase of Rs. 35 per k.l. of the finished product. It is true that price has not been revised since 1985. However, producers were offering discounts and freight rebates which were later discontinued.

Leading consumers have alleged that the three refineries have virtually formed a cartel, dictating not only price but carving out their exclusive markets. If private sector units had done the same, the Monopolies and Restrictive Trade Practices Commission would have swung into action, a leading consumer said.

As per their understanding, BPCL is catering to Bombay and the rest of Western regions south of Bombay. IOC's Koyali facility is catering to North of Bombay and Gujarat. Customers in the South like Tamilnadu Petroproducts and Hindustan Organic Chemicals will now receive supplies from CRL.

To protect local producers the Government clamped a 25 per cent duty on benzene imports in the recent Budget. The international price is about $440 which, without duty, works out to Rs. 6,600 a tonne. In contrast, Indian consumers have to pay about Rs. 9,000 (inclusive of all duties net of Modvat) from now onwards.

The public sector Hindustan Organic Chemicals (HOC) has a near monopoly of a wide range of benzene-based products which are the starting raw materials for dyestuff and pesticide industries. HOC had telexed consumers announcing a price hike on April 1. Another price increase is very likely to absorb the benzene price rise. The linear alkyl benzene (LAB) industry, characterised by intense competition and price wars, may not be able to pass on the price increase to its consumers.

BPCL BENZENE PLANT CLOSED

The benzene plant of Bharat Petroleum Corporation Ltd. (BPCL) in Bombay has been closed again due to technical problems. Refinery sources expect the production to resume next week.

The plant was recommissioned a few months ago after a devastating fire had gutted storage tanks of the plant late last year.

Meanwhile, exporters of benzene-based dyes and pesticide intermediates propose to represent to the government their difficulties following the 19 per cent price hike jointly effected by the three refineries with effect from May 16.

Gujarat State Fertilisers Corporation (GSFC) which uses benzene to make caprolactam, can afford to pass on increased costs to its consumers. Phenol prices have gone up by Rs. 5.30 a kg since March last and may go up again. (HOC's phenol plant is incidentally closed due to power cut).

Another benzene derivative, PNCB, will become dearer, inflamming the price of paracetamol. Leather chemicals manufacturers, who had a hard time weaning away tanners from imported brands to theirs, will stand to lose their customers if they increase their prices. Styrene-based plastics like ABS and polystyrene may also see the impact of benzene price hike.

The current demand for benzene is estimated to be close to two lakh tonnes a year. This is expected to increase to 2.35 lakh tonnes when Fertilisers and Chemicals Travancore (FACT) commissions its caprolactam plant by this year end. CRL is hopeful of producing some 72,000 tonnes this year. As things stand, supply and demand are more or less evenly matched.

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Protection is not the answer

Protection is an easy way out, or so it seems, but it is NO answer to India's economic and trade problems. This is the message of two articles in the recent issues of the revered management journal, Harvard Business Review. The first article (WHY PROTECTIONISM DOESN'T PAY, Robert Z Lawrence and Robert E Litan May-June 1987, pages 60-67) points out that, contrary to common belief, the massive US trade deficit is not the result of unfair trade practices by overseas competitors. And in any case, protection will not improve the situation in this respect and ultimately it may hurt USA more than it would its competitors. The real answer is much more fundamental: to close the gap between production and spending. According to the basic law of economics, any country that spends more than it produces, must run a trade deficit.

Trade deficit in USA for 1986 was the highest ever: $170 billion and this has questioned the wisdom of free and open trade which has been preached by the USA for many years. The supporters of protection rest their arguments on two factors: How can US with a $12/hour wage level ever compete with Korea's $2/hour wages? And the international marketplace is unlevel, with US playing by the rules of the free market, but many other countries while paying lip service to this impose heavy tariffs against imports. But these arguments are based on shaky foundations. A country that spends more than it produces cannot but run a trade deficit. From 1981 through 1985, real US spending has increased by 23%, some 7% higher than the rise in production. Much of this has been in the government sector and private sector's savings have not increased to offset the former. No wonder, then that an element of protectionism will not save jobs or rejuvenate industries. What is the answer? The imbalance between spending and production must be corrected, but this is not easy and it cannot be accomplished overnight. This can be achieved in one or more of these possible ways:

REDUCE PRIVATE INVESTMENT: This is the least desirable, in fact, investment must rise.

INCREASE PRIVATE SAVING: Far more desirable, but its achievement is doubtful.

SHARP REDUCTION IN GOVERNMENT DEFICIT: By far the most feasible, though politically most difficult. It cannot, perhaps, be eliminated, but reduction from $150-200 billion to some $50 billion is possible. But it must be done gradually lest the economy slides into a recession.

The second article (ASKING FOR PROTECTION IS ASKING FOR TROUBLE, Max Levinson, pages 42-4, 46-7) calls the 'spade a spade' and points out the folly of asking for protection. Although it may help in the short run, in the long run it is invariably damaging to everyone and the country as well. In fact, protection will only postpone the problem and make it even more severe. To support this thesis it is pointed out that when the Japanese cars were kept out Generals Motors got hurt. Active lobbying by Ford and Chrysler led to a voluntary restraint agreement (VRA) during 1981-4 under which imports of Japanese cars into the US were restricted to 1.68 million cars per year, later increased to 1.85. Under protest from General Motors, VRA was not renewed in 1985, but Japanese government unilaterally renewed it and at a higher level of 2.31 million cars. Both Chrysler and General Motors benefitted by importing more cars from their Japanese collaborators. In addition, this voluntary restriction on exports to US enabled the Japanese companies to increase their exports to Europe, thus gaining a solid market share there in competition with cars made by Ford and GM. The restriction arising from the protectionism lobby, really helped Japan more than it did to USA and in totality may have actually harmed the USA. The same story has been repeated both in the case of steel industry as also the telecommunications industry. An apparent gain by the US steel producers is more than offset by their loss in the international markets. Likewise the seeming victory for AT & T ran hollow and the real winner was Northern Telecom, the US subsidiary of a Canadian company that has emerged as a strong competitor to the US companies. Thus the protection fought for so ardently by the US industry, has backfired in almost every case. And seldom have the benefits accrued to the company which asked for protection in the first place. Protection and quotas can work in both ways, one annulling the other. Thus quotas on Korean goods may also restrict desirable imports from countries such as Brazil and Taiwan. Also the quotas may last as long as five years, whereas the company may desire only a short term relief until it finds desirable suppliers of its own. Trade protection is seen as a blunt instrument and it can seldom be used to advantage in the long run. And the wishes of protectionists: Quotas sheltering a company without sapping its strength may remain a pipedream.

Dr. Kharbanda, a Fellow of the Institution of Chemical Engineers, is a visiting professor and an author of repute. His latest title: CAPITAL COST ESTIMATING FOR THE PROCESS INDUSTRIES with E.A. Stallworthy (Butterworth end-1988).

Pollution: standards for power, water in offing

The Central Pollution Control Board (CPCB) proposes to fix standards for better and efficient use of power and water to save the environment and curtail wastage.

Stating this at a recent meeting of the PHE Chamber of Commerce and Industry (PHDCCI), the CPCB Chairman, Mr. P.C. Tyagi, said the board had also identified certain 'hot-spots' for attention to take care of the entire area. The board was earlier adopting an industry-wise approach.

Similarly, the State Pollution Control Board would also concentrate on such 'hot-spots'.

Mr. Tyagi clarified that under the recent amendments, consent was now necessary under the air and water Acts for establishing and operating industrial units.

Possibilities were being examined to introduce the concept of 'common treatment plants' for the benefit of the small-scale units. In Delhi itself, he said, 28 centres of the clusters of SSIs had been identified. However, despite the best efforts of the board the common treatment plants could not be established.

He drew the attention of the participants to the measures being adopted in case of vehicular traffic for which emission standards had been already fixed. In addition, the manufacturers of vehicles were also approached for requisite changes in design of the equipment to control pollution, he said.

Earlier the chamber, while advocating attractive incentives for installation of pollution control equipment, said that the incentives provided for adopting pollution control measures were much less in India as compared to other countries.

PHDCCI further represented that a number of industrial units had already taken substantial steps and even submitted time-bound plans for treating effluents.

However, in most of these cases consent had not been given on the grounds that they should first achieve the specific standards and norms. The chamber said that new and foreign technologies were being tried for this purpose but for lack of time to implement these, it may not be possible to achieve 100 per cent success on this count.

The chamber has, therefore, suggested that to encourage the units to go ahead with their treatment plants it was necessary to give them conditional consent. Otherwise, it felt, it would be difficult to operate industrial units and the investments made in them would be wasted.

PANEL ON NATURAL RESOURCES INFORMATION

The Planning Commission has constituted an expert committtee on National (Natural) Resources Information System (NRIS) for optimal configuration among various sectoral data basis and at various decision-making levels, an official release said. The 11-member committee, with the representative of the Department of Space, as its Chairman, will include representatives of the Geological Survey of India, the National Bureau of Soil Survey of India, the Planning Commission, the Department of Science and Technology and the National Informatics Centre. The experts will examine the recommendations of the task force on NRIS. They will also provide guidelines for formulation of experiments and invite proposals to be carried out towards development and establishment of NRIS and suggest ways and means of demostration of the same through suitable organisational arrangement.

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CAPROLACTUM PLANT

French firm ties up with SAIL

Technological tie-ups have been made with French and Polish firms for the setting up of a Rs. 440-crore caprolactum plant at Sindri in the joint sector by the Bihar government, Shri Ram Fibres and Steel Authority of India.

While a French firm, Francais du Petrols, would provide technology for production of benzene-cyclohexane. A Polish Company, Ciech, would give the know-how for that of cyclohexane-caprolactum.

Arrangements for supply of raw materials, water, power and other essentials have been also made for the project envisaging production of 50,000 tonnes per annum.

A state government spokesman told newsmen that it would be cleared soon by all the Central agencies involved as the Bihar chief minister, Mr. S.N. Sinha, had met the Union industry minister in Delhi recently and pleaded for this purpose.

Mr. Sinha had also urged the early clearance of seamless tube project, a joint venture of Bihar Alloy Ltd. (a Jhabar group company) and Bihar State Credit and Investment Corporation, which would be located in Hazaribagh district with an annual capacity of 50,000 tonnes.

The Bihar chief minister has called for quicker approval of some other projects including a pig iron complex in the central sector by SAIL at Mancharpur in industry-dominated Singhbhum district of the state.

The complex with initial capacity of 0.9 million tonnes per annum is proposed to be subsequently expanded and converted into an integrated steel plant. The site selected for it is close to coal and iron ore mines and therefore the transportation cost could be lower than at Tisco, and Vizag Steel plants.

The spokesman said that the chief minister had reiterated the demand for a petrochemical complex in Bihar with expansion of the Barauni oil refinery in the state to 5.5 million tonnes from 3.3 million tonnes. The expansion will provide adequate quantities of naphtha for the project.

The chief minister has also urged for a letter of intent for the optical fibre cable and revalidation of letter of intent for polyester filament yarn projects.

HOECHST TO RAISE WEEDICIDE OUTPUT

Hoechst India Limited is expanding its capacity for making isoproturon technical, a weedicide, from 400 tonnes per annum (TPA) to 650 TPA. The expansion, to be undertaken at the company's existing unit at Ankleshwar, Gujarat, will cost Rs. 98 lakhs. The government has recently cleared the company's expansion project.

According to official sources, the company proposes to raise resources for the expansion programme through loans from financial institutions and internal generation. In fact, it is learnt that the company proposes to raise as much as Rs. 49 lakhs from the financial institutions and the balance from internal generation.

While approving the project the government has stipulated that 50 per cent of the production from the licenced capacity, after expansion, should be distributed to non-associated formulators. Similarly, the manufacture of technical material, it is specified, should commence from the basic stage.

The company's proposal was initially objected to by Gharda Chemicals Ltd., which maintained that adequate capa ity existed at present with the indige ous manufacturers. Accordingly, the was no likelihood of any shortage in t country. In fact, it argued Hoechst i ported intermediates required for ma ing isoproturon resulting in addition burden on scarce foreign exchange.

Hoechst, on its part, maintained th currently there was shortage of th important wheat weedicide. It furth clarified it was committed to making t weedicide from the basic stage. Till achieved production from the bas stage intermediates required would b procured indigenously.

The government, on its part, felt th there was scope for the creation further capacity for making the impo tant weedicide. Similarly, indicatio were that even export prospects we encouraging. Further, the proposed ite of manufacture was covered und appendix-I and large industrial house were normally eligible for taking up i manufacture. The government als noted that Hoechst had taken steps t procure the raw material indigenously Accordingly, it favoured the company' programme for the expansion of th wheat weedicide.

MAFATLAL DYES

The net sales of Mafatlal Dyes an Chemicals during the nine month period ended March 1989 amounted t Rs. 32.06 crores against Rs. 30.4 crores in the corresponding period las year and Rs. 42.65 crores during 198 for 12 months period.

According to the unaudited results, i has earned a slightly lower gross profi of Rs. 180.25 lakhs against Rs. 181.5 lakhs and Rs. 217.98 lakhs in 1987 After depreciation (Rs. 6.25 lakh against Rs. 13.12 lakhs) and taxatio (Rs. 75.71 lakhs against Rs. 77.8 lakhs) the net profit amounted t Rs. 98.29 lakhs against Rs. 90.61 lakh and Rs. 110.62 lakhs in 1987.

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Hindustan Lever to set up LAB project in Punjab

The multinational, Hindustan Lever -- engaged mainly in the manufacture of soaps and detergents -- has been allowed to set up a linear alkyl benzene (LAB) project in Punjab. Estimated to cost about Rs. 200 crores, the project would have a capacity to produce 60,000 tonnes of the detergent raw material annually. The exact location of the project has not yet been decided.

Besides the Lever project, the two other LAB proposals that have been cleared for implementation are Nirma's application for a unit at Visakhapatnam and Straw Products' intent to set up a similar unit at Mathura. The three proposals were approved by the Cabinet Committee on Economic Affairs (CCEA) at its meeting held in New Delhi recently. While no export obligation has been imposed on the projects, the committee has, however, stipulated that the promoters would have no recourse to banks or financial institutions for assistance. In other words, the companies will have to fund the LAB projects through internal resources, public issues or market borrowings.

The clearance to Hindustan Lever for the project in Punjab runs counter to the news reports earlier that the multinational had been edged out of the race by Grasim Industries for a LAB unit at Karnal in Haryana. (see page 45). It was contended that while Nirma Chemical Works had been cleared for the project at Vizag, Grasim and Straw Products had been given charge of projects at Mathura and Karnal respectively.

It is now learnt that Grasim Industries is nowhere in the picture at all as its application was rejected earlier by the Project Approval Board (PAB). At a meeting in June last year, PAB had cleared Nirma for Vizag, Straw Products for Mathura and Hindustan Lever for Karnal. Sources in the Department of Chemicals and Petrochemicals say that for LAB projects, only these three proposals werre placed before the Cabinet panel for approval.

INSTRUMENT MAKERS SEEK DUTY CUT

Instrument manufacturers have moved the Directorate General of Technical Development (DGTD) to reduce import duty rate to 60 per cent on more component items necessary to indigenously produce a wider range of process control and analytical instruments.

A delegation led by Mr. Vinay Toshniwal, president and Mr. Premchand Goliya, secretary, of All India Instrument Manufacturers and Dealers Association, recently met Mr. H.C. Gandhi, secretary to DGTD, and urged him to include items like optical instruments, microscopes of all kinds including those for research, electric moisture meters, electrical testing and measuring instruments etc. in the Notification No. 97/89 of March 1, 1989, which has fixed import duty at the rate of 60% on certain components. Such a step would immensely boost indigenous output of instrumentation industry.

The delegation also urged the DGTD to dispense with the need for small-scale industries to obtain certification from the development commissioner for becoming eligible for concessional rate of import duty, because the small units dispersed all over the country would find it hard to obtain such certification. The delegation pointed out to the DGTD that the present policy allowed about 350 vital electronic and medical instruments required for priority areas like pollution control, health care, etc. for imports under Open General Licence (OGL) (as per appendix 1B and appendix 6, list 2) of the import policy 1988-91, while their parts and subassemblies are not allowed to be imported under OGL and customs duty on parts and sub-assemblies are f higher than the duty on a comple instrument.

COPPER, NICKEL PRICES CUT

The Minerals and Metals Tradin Corporation of India has decrease prices of copper and nickel due to fa in international prices. However, price of zinc, lead and tin have been increase due to appreciation of the US dolla against the rupee and rise in interntiona prices. According to a press release o the corporation, prices of copper hav been reduced by Rs. 2,000 per tonn and nickel by Rs. 7,000 per tonne Prices of tin were increased b Rs. 25,000 at Rs. 3,55,000. Lead an zinc prices have been raised by Rs. 70 and Rs. 500 per tonne respectively.

OIL TO STRENGTHEN TELE COM SYSTEM

An ultra high frequency (UHF) tele communication system is being installe along Oil India Limited's sophisticate pipelines from the oilfields of OIL an ONGC in the north-east to the four east ern sector refineries, including Baraun in Bihar, according to Mr. Surjit Cha liha, chairman, Oil India Limited. The chairman of OIL said that this is one o India's first UHF systems, installed a cost of around Rs. 16 crores. It is now fully operational in the 16-inches secto of the pipeline between Duliajan and Guwahati.

A multi access radio telephone system has also been introduced in 1989 in OIL's operational areas in Assam and Arunachal Pradesh for efficient management of operations in far flung and remote areas, he said. Under a massive automation programme, the company plans to augment the existing computer facilities at Duliajan, by acquiring a sophisticated and powerful CDC-Cyber 180/830 mainframe computer system for seismic data processing, reservoir simulation studies and computer-based MIS, under automation programme of the organisation, Mr. Chaliha said.

3 LAB projects cleared

The Union cabinet has cleared the pplications of Nirma Chemical Works, traw Products and Grasim Industries or setting up linear alkyl benzene LAB) projects of 60,000 tonnes per nnum capacity each. The projects will ntail an investment of Rs. 150 crores ach.

Nirma has been chosen to implement he project at Vizag, while Straw Products will set up the plant at Karnal. The hird project would be implemented by Grasim Industries at Mathura, according to the Union industry minister, Mr. J. Vengala Rao.

The cabinet committee on economic affairs (CCEA), which took this decision at its meeting held at New Delhi recently, has stipulated a condition that none of these promoters will be allowed to seek financial assistance from banks or financial institutions for setting up these projects. Also, no export obligation has been imposed on the projects.

The CCEA decision brings to an end the controversy over creation of fresh LAB capacity in the country. There was considerable opposition to the establishment of additional capacity to the tune of 180,000 tonnes on the ground that existing manufacturers with a total annual capacity of 160,000 tonnes were facing difficulty in selling LAB in the domestic market and were forced to undertake exports as a way out. LAB is a basic raw material for the synthetic detergent industry.

The cabinet's decision also means that Hindustan Lever has been edged out of the race for setting up a LAB project. The multinational giant's application was reported to have been cleared by the project approvals board (PAB) in June last year. In fact, PAB had approved the applications of Nirma for the Vizag project, Hindustan Lever for Karnal and Straw Products for Mathura. Grasim's application had been rejected by PAB.

Subsequent to the PAB clearance, however, Hindustan Lever had reportedly told the department of chemicals and petrochemicals that they would prefer any other location than Karnal, where the feedstock may not be available too soon since the implementation of the Karnal refinery project was being delayed.

On the other hand, the LAB project to be located at Mathura and Vizag would have got the raw materials without any delay or difficulty since the refineries there are in operation. It is not clear as to what the reasons were for rejecting the Hindustan Lever's application and clearing the Grasim proposal.

According to an official of Hindustan Lever, the company was not aware of any decision. "As far was we are concerned, our application is with the government", he said.

Official sources say that approval to the Hindustan Lever would have meant

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allowing a multinational firm to have control over the production of a substantial part of its raw materials. Hindustan Lever is a large producer of detergents and at present buys its entire requirement of LAB from the market. The LAB project would have been a plant for captive use for producing its detergents.

Nirma, which is also a detergent manufacturer, has however been given the green signal. The reasons, official sources say, are perhaps the promoter's small-scale status. Grasim and Straw Products are not producing any detergents.

With the cabinet clearance, there would be 6 LAB producers in the country. These would be -- with their annual capacities in brackets -- Indian Petrochemicals Corporation Ltd. (IPCL) (40,000 tonnes), Reliance Industries Ltd. (60,000 tonnes), Tamil Nadu Petro Products (60,000 tonnes), Grasim, Straw Products and Nirma (all three with 60,000 tonnes each).

IPCL was the first to start producing LAB. In 1987, Reliance and Tamil Nadu Petro Products, a subsidiary of SPIC, set up the plants. With these clearances, the big houses of Reliance, SPIC, Birla and JK would be operating in this industry.

The opposition to the creation of fresh capacity in LAB was so strong that the cabinet committee had been postponing the consideration of the three proposals since December, despite this being on the agenda. Recently, the cabinet committee took it up for consideration and its decision has taken many in the government and industry by surprise sources say.

PLAN TO BOOST PLASTIC-BASED INDUSTRIES

To give an impetus to the plastic-based industries and encourage entrepreneurs, three programmes were launched at Amritsar on May 30. Petrofils Co-operative Ltd., Vadodara would organise a workshop on th development of handlooms blende with polyester filament yarn in whic more than 600 weavers from differe parts of Punjab participated.

Indian Petrochemicals Corporatio Ltd. (IPCL), Vadodara would hand ove 4,000 plastic crates to Punjab Agr Industries Corporation of fruits an vegetables on experimental basis as step to modernise marketing and dis tribution system of horticultural pro duce.

An extension centre of Central Insti tute of Plastics Engineering and Tech nology (CIPET) will be opened t provide technical trained manpower fo plastic industries, consultancy and spe cial training to the industries and entrep reneurs. The project will be completed in about three years with an investmen of Rs. 4 crores.

The programmes will be inaugurated by Mr. M.S. Gill.

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Production of more bulk drugs urged

The value of production of bulk drugs egistered an impressive rise of over 10 er cent to Rs. 530 crores in 1988-89 gainst less than five per cent in 987-88. The Union Government's Department of Chemicals and Petrohemicals expects a sharper rise of bout 15 per cent in the value of proluction of bulk drugs during the current ear.

Even so, there is no room for complacency as the Government wants the ndustry not only to step up exports of ulk drugs but also reduce, if not avoid, mports of certain other bulk drugs. It is, therefore, strange that, instead of launching a drive to pace production of bulk drugs the industry has urged the Government to consider abolition of the "ratio parameters" scheme under which producers in the organised sector are obliged to produce bulk drugs in certain proportion to the ex-factory value of their production of formulations. If producers are freed from this obligation, most of them are likely to concentrate on production of formulations as this line of activity is generally more profitable than producing bulk drugs.

It is true, of course that the small sector is increasingly going in for bulk drugs. The annual report of the Department of Chemicals and Petrochemicals for 1988-89 has stated with reference to the failure of the organised sector to reach production targets for bulk drugs that "in many cases the decline in production in the organised sector has been caused by cheaper production from the small-scale sector. Hence the availability of these drugs in the market has not been adversely affected".

Yet, it will not be prudent to abruptly abandon the ratio parameters scheme, especially when even the concerned authorities have no data on the small sector's capacity to replace the organised sector in the area of bulk drugs. It must be emphasised that production of bulk drugs, unlike that of formulations, is highly capital and technology intensive. This coupled with the fact that the country is still deficient in antibiotics and certain other bulk drugs whose production involves the use of highly sophisticated plants and technologies, underlines the need to sustain the interest of the organised sector in production of bulk drugs.

Not surprisingly, therefore, even as the Government made the ratio parameters scheme more stringent to force the organised sector to step up production of bulk drugs, it revised pricing norms to allow producers of bulk drugs to improve their profitability.

Producers of bulk drugs falling in controlled categories have been allowed to earn up to 14 per cent post-tax return on net worth, on 22 per cent return on capital employed. The third option provides for long-term marginal costing with 12 per cent internal rate of return in the case of new plants.

Although the new drugs policy has thus made production of bulk drugs a profitable proposition, in practice, producers are denied the promised rate of return partly because of the delay on the part of the Government in fixing or revising prices, and partly because of disallowance of certain expenses.

If this is looked into, the organised sector is unlikely to resent the obligation to produce bulk drugs. The Government and the industry must act in concert to pace production of bulk drugs for meeting demand at home, reducing imports and raising exports.

-- **Financial Express**

ICMA AWARD FUNCTION

ICMA annual award function and Dr. G.P. Kane Trust Lecture by Dr. M.S. Swaminathan, President, National Academy of Sciences of India will be held on 9th June at Bombay.

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Vam Organics may take over Noble Explochem

Vam Organic Chemicals Ltd. is likely to take over the ailing Noble Explochem Ltd., a company jointly promoted by Noble Industries, parent company of AB Bofors, and the Maharashtra Government Agency, SICOM.

It is learnt that Noble Industries holds 20 per cent of the equity in the company and SICOM 26 per cent stake.

Vam Organics is currently negotiating a deal, which is believed to be in the final stages, with SICOM to buy out the latter's share and in the process take over the management of Noble Explochem. Sources, however, say that the move is a step towards merger of Noble Explochem with Vam Organics.

When contacted, Mr. Hari Bhartia, Managing Director of Vam Organics, contradicted reports about the merger. He, however, hinted at the possibility of Vam's participation in Explochem's management to bring it out of the red. Noble Explochem has suffered losses ever since its inception.

On the other hand, those who propagate the merger theory point out that the take-over is a preparation for the merger. In this regard, it may be recalled that Vam Organics and Bofors were jointly involved in another project from which the latter had to withdraw in the heat of the guns scandal.

For the India Glycols project, Noble Industries had provided the technology for monoethyl glycol and had also intended to participate in the equity. However, in light of the Bofors gun scandal, it had to beat a retreat.

Industry sources said that Noble Industries is now keen on making a comeback to the project, for which, they point out, this complex inter-corporate manoeuvre has been designed. They, however, say that the merger plan has infact run into trouble on account of a dispute in the conversion factor of Explochem shares to bring them in tune with Vam's share value. Vam Organics share is presently quoted at Rs. 165 in the market, whereas an Explochem scrip is around Rs. 15 at present.

The Vam management is insisting on a conversion factor of 1:10, that is ten shares of Noble Explochem be considered as equivalent of one share of Vam Organic, whereas Noble Industries is understood to be insisting on a conversion of seven shares of Explochem to one of Vam Organic.

In either case, the market is expecting a boom in Explochem's share price.

The possibility of a takeover or a merger has fuelled wild speculations in the stock markets. Till last month, the share of Noble Explochem was quoted below par at Rs. 8 and was only occasionally traded.

When rumours of the impending merger gripped the market, the scrip rose rapidly to be quoted at Rs. 22 by the end of the month. However, subsequently, owing to profit-taking and prevailing poor market sentiments, the scrip declined to about Rs. 15. Market sources, however, reveal that heavy buying is continuing in this scrip.

However, the Maharashtra Government's response to the proposal is not yet known. the Maharashtra Government agency, SICOM, can veto the proposal by virtue of its 26 per cent holding in Noble Explochem. But, if Mr. Bhartia is to be believed, the negotiations for purchase are already on and will be completed shortly.

The other State Government agency, which will be required to give its nod to the plan, is UPSIDC which holds a stake in Vam Organics.

GERMAN AID FOR COAL MINING

West Germany has promised ai worth 480 million marks (240 millio dollars) to help India implement its coa mining projects.

The pledge was made by Economi Ministry State Secretary Dieter Vo Wuerzen at a meeting of the Wes German-Indian Economic Co-operatio Commission, a Bonn spokesman saic The Indian delegates to the commissio outlined New Delhi's plans in the coa sector and said India was interested i German coal mining technology an knowhow.

PERSONALITIES

* Dr. K.K.S. Chauhan, managing director, KRIBHCO, has been electec chairman of the agro-economics com mittee of the International Fertilise Industry Association. He is the firs Asian to hold the coveted position o chairman of the agro-economics com mittee of IFA.

* Mr. Arwin K. Jain has taken over as chief corporate communications man ager of Bharat Petroleum Corporation and will be in charge of public relations and communications.

* Mr. K.A. Iyengar has been appointed managing director of Mather and Platt (India) Ltd. with effect from May 1, 1989. Prior to this, he was jointly managing director of the company.

* Mr. R. Sivaramakrishnan has been elected president of the All India Alcohol-Based Industries Development Association for the year 1989-90. Mr. P.M. Kavadia, Mr. Anil Ruia and Mr. J.C. Taneja are the vice-presidents of the association.

* Dr. Allan Saldhana has joined the SM Group of companies as presiden with responsibility for the speciality chemicals and consumer product activ ities of the group.

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Oswal Agro asked to restart UCIL's Chembur unit

Oswal Agro Mills have been permitted by the state government to restart its recently acquired unit (from Union Carbide) at Chembur petrochemical complex. However, the government has put several stiff conditions, which if not fulfilled, will stall the unit coming on stream.

The conditions include: implementation in toto the recommendations of Garg committee on industrial safety and other matters to the satisfaction of the labour and environment departments; certification from Engineers India Ltd. for integrity and safety of the equipment and plant and any conditions put forward by the environment department to ensure pollution abatement.

The Oswal Agro unit will also be governed by the Industrial Location policy which does not allow expansion in zone II of BMR where the plant is located.

Further, the permission for transfer of land will be given only after 50 per cent of the un-earned income from land given by the government to Union Carbide is credited to government. The land will be held by Oswal Agro for the same purpose and on the same conditions on which they are held at present by Union Carbide (India) Limited. Both the UCIL and Oswal Agro Mills will have to comply with other statutory requirements.

If the unit is restarted, it would provide continuity of jobs to about 900 workers, who will be absorbed without interruption in service and on terms not less favourable than those which they are currently enjoying.

This was announced by the chief minister, Mr. Sharad Pawar in his post-cabinet meeting press conference. Mr. Pawar also announed that the state government has decided to set up a sub-committee of the cabinet, under the chairmanship of the industries minister, Mr. Ramrao Adik to evolve a policy for the revival of over 10,000 sick industrial units in Maharashtra. The government would study the possible relief and concessions to be given for their revival.

US CONSORTIUM ON SUPERCONDUCTING RESEARCH

Two major US companies and a university have announced that they are forming a research consortium to explore new superconducting technologies that could pave the way for major advances in computers and telecommunications.

The consortium for superconducting electronics, formed by American Telephone and Telegraph Corporatiion (AT and T), International Business Machines (IBM) and the Massachusetts Institute of Technology (MIT), said it will focus on applying superconductors to high-speed electronic devices, where the first practical applications are considered as close as two years away.

The corporate members will share research information that is developed by the consortium and details on the ownership of individual patents were being worked out. Under a joint intellectual property agreement, the companies will share with the university any profit that might come from commercial success.

The new consortium will present a plan requesting up to $6 million in Government funding over the next three years, most of which would go to the Massachusetts Institute of Technology. The consortium members together would contribute an equal or greater amount. The new superconductors are ceramic materials that conduct electricity without losing energy from resistance.

Until three years ago, this requ cooling metal alloys down to near a lute zero, or about minus 270 deg centigrade. But the discovery of "high temperature" materials become superconducting at temp tures as high as minus 147 degrees tigrade make the use of superconduc more practical.

Superconductors in theory will al energy to be stored and transmitted no loss of strength and more chea than at present. Scientists envision such materials might one day be u to make powerful electrical storage teries, magnets and motors, and elect ity transmission lines that do not power, and levitating trains.

PHOSPHORIC ACID SHORTA

Uncertainty looms large over future of the giant public sec Rs. 542-crore Paradip Phosphates L ited at Paradip, 120 km from Bhub eswar, under closure for the last f months due to non-availability of ph phoric acid.

The plant, which produces 2 tonnes of diammonium phosph (DAP) per day, requires phosphoric a and sulphuric acid as raw mate which are imported.

According to plant sources, the ac imported mostly from Gulf countr had become scarce in the internatio market, following steep hike in their p ces. In fact, the government had fou it would be cheaper to import D directly from outside than to import acids for manufacturing DAP at hor

The Paradip Phosphates Employe Union, affiliated to the INTUC, threatened to launch an indefin hunger strike from June 6 if the ma agement did not make efforts to co mence production in the pla immediately. The employees had star a "dharna" outside the plant since M 20 in support of their 6-point deman

JK Synth. bags Saleempur project

JK Synthetics has finally clinched the aleempur aromatic project. The Cabet Committee on Economic Affairs CCEA) has finally approved the proosal of J.K. Synthetics for setting up Rs. 900-crore aromatic plant at aleempur in U.P.

The battle for the massive project was oing on for the past few years and the uthorities had short-listed three indurial houses, the Aditya Birla Group, eliance Industries and J.K. Synthetics f the Singhania Group.

CCEA finally decided to award the roject to J.K. Synthetics a fews days go rejecting the claims made by other ontenders.

The Saleempur project will be based n naphtha to be supplied from the Mathura Refinery. It will produce 1.50 kh tonnes of PTA, one lakh tonnes of enzene and 1.10 lakh tonnes of paraxlene per annum.

The project will be located in Aligarh district, about 55 km away from the refinery. The naphtha will be drawn through a pipeline and the project will oe commissioned within 30 months from the date of receipt of all clearances.

J.K. Synthetics has promoted a new company J.K. Aromatics Ltd. to undertake the aromatic project. The Singhania Group itself is a large consumer of PTA for the manufacture of polyester yarn and polyester fibre.

The group companies J.K. Synthetics, Raymond Woollen and Orissa Synthetics, currently consume about 35,000 tonnes of DMT, the alternate raw material, for polyester products and its consumption is expected to rise to nearly one lakh tonnes in about three years as the group's major companies, J.K. Synthetics and Raymond Woollen, have undertaken massive expansion plans.

PENICILLIN-G PROJECTS

The Union government has cleared seven projects for manufacturing penicillin-G entailing a total investment of over Rs. 280 crores. Another project cleared pertains to manufacture of geotextiles, a petrochemical product, at an investment of Rs. 95 crores. The Cabinet committee on economic affairs approved the seven penicillin-G projects and the geo-textiles project at its meeting at New Delhi recently. These proposals had earlier been cleared by the Project Approvals Board (PAB).

Penicillin-G is an intermediate drug used for manufacture of a variety of anti-biotic formulations. Geo-textiless is a petrochemical product having industrial uses.

The seven penicillin-G proposals, which have been cleared, are from SPIC, Gujarat Industrial Investment Corporation (GIIC), Eskayef, Sol, Pharma Biotidin, Ranbaxy and JK Industries. These projects would be located in Tamil Nadu, Gujarat, Karnataka, Hyderabad and Uttar Pradesh (both Ranbaxy and JK Industries), respectively.

The total capacity to be added by these projects to the domestic penicillin-G industry is over 4,000 million units per annum.

At present, there are only two public sector undertakings, Indian Drugs and Pharmaceuticals Limited (IDPL) and Hindustan Antibodies Limited (HAL), manufacturing penicillin-G.

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OPEC's output poses threat to oil prices

The Organisation of Petroleum Exporting Countries is pumping at the highest rate of the year, posing a latent threat to oil prices.

OPEC officially continues to maintain that most member nations remain well within their production quotas, which total 18.5 million barrels a day for the 1989 first half. But a survey of leading outside monitors of OPEC output placed the current estimated production level of the 13 exporters at some 21 million barrels a day, or about 2.5 million barrels above the ceiling.

That still is down from the 1988 peak of nearly 23 million barrels a day reached in December. But trackers of OPEC output note that this year's production has been edging up monthly since sharp January reductions. Some look for further increases as the oil ministers jockey for position ahead of their June meeting, which is expectd to result in an increase in OPEC's second-half ceiling.

Nevertheless, world oil prices bounced higher with spot prices of North Sea crude up as much as 55 cents a barrel and U.S. futures prices of West Texas intermediate for June delivery breaking through $21 a barrel before settling at $20.70. The rally was sparked by rumours of OPEC output cuts.

As evidence of the increased OPEC output surfaces, oil economists and analysts suggested, petroleun prices may begin to deteriorate after the 50% runup of recent months.

Price decline expected

It is very unlikely we are going to see West Texas intermediate stay around $21 a barrel, said Vahan Zanoyan, senior director of Washington-based Petroleum Finance Co., which estimates OPEC production to be atleast 21 million barrels a day. Mr. Zanoyan said he expects the WTI price to decline to $19.50 or $20 by the time the oil ministers gather in Vienna for their midyear meeting.

If the latest news of higher OPEC output has reached the non-OPEC exporters who met in London recently, they didn't make any reference to it. This was their third meeting this year and was intended in helping to prop up the price of oil.

The independent exporters -- including Mexico, Egypt, Oman, China and the Soviet Union -- pledged earlier to reduce second-quarter output by about 300,000 barrels a day. After the meeting concluded, non-OPEC delegates said they still are committed to cooperation with OPEC, but said they wouldn't decide their course for second half until after OPEC meets in June. A communique issued by the non-OPEC group expressed the hope that the scheduled June ministerial meeting of OPEC would further advance the common interests of oil producing and consuming countries.

Though several OPEC ministers want an increase in the second-half production ceiling along with higher quotas for their own countries, a split may be developing. Both Kuwait and the United Arab Emirates, currently producing well beyond their quotas, want a much higher ceiling, as well as bigger allotments for themselves.

On the other hand, Saudi Arabia, OPEC's linchpin, is apparently leaning toward little if any increase in the ceiling for the second half. Some others, including Iran, apparently would be content to hold the ceiling near the current level, permitting prices to rise beyond the OPEC target of $18 a barrel if oil demand remains high.

Difference in interpretation

There is a difference in interpretation of what constitutes OPEC production. For quota purposes, OPEC defines it as only that oil which is sold. Oil moving into storage wouldn't be counted un it is sold. But amounts of oil going or out of storage is not known.

Meantime, the outside monitors th track OPEC's output insist it is risin Geneva-based Petro-Logisucs Ltc which estimates the average for the fir three weeks of May at 21.1 million ba rels a day, reports that high supply leve are so far being observed from Kuwa Iran, Nigeria, UAE (the Emirates) an Iraq.

OPEC Listener, an industry analys service, estimates that total outpu climbed from 19.6 million barrels a da in January to 20.7 million barrels a da in April. May looks like 21 million, sai Cristina Haus, an analyst at OPEC Lis tener.

HINDUSTAN LEVEL TURNOVE EXCEEDS RS. 1000 CRORES

Hindustan Lever hopes to maintain it record of consistent profit growth durin the current year. The turnover exceede the Rs. 1,000-crore mark during th year ended Decemer 1988 despite it Sewri unit being afflicted by labou unrest and lockout since June last. Th lockout is still continuing. The compan has announced a dividend of 32% fo 1988 against 25% in the previous yea

Addressing the 56th annual genera meeting at Bombay on May 26 Dr. A.S. Ganguly, chairman, said tha following an excellent monsoon las year, the company's performance in th first four months of 1989 was "signif icantly ahead" of the correspondin period last year.

Responding to queries of shareholders about the continuing lockout at th Bombay factory, Dr. Ganguly state that in recent weeks, several hundere employees had got disillusioned wit their union leaders and appeared kee to return to work based on an hone commitment to production and disci line.

A significant accord

The agreement reached between the Governments of India and Soviet Union on barter exchange of the latest technology in the field of drugs and pharmaceuticals is a significant one. It gives the drug policy the kind of turn that should help in the process of indigenisation. It further reduces the nation's dependence on Western multinational corporations and should contribute to development of bulk drugs on commercially viable terms. The nature of the bilateral accord naturally raises the question why it was not thought of earlier during periodical revisions of the drug policy by the Government. All the more so when we consider that the Soviet readiness to part with know-how, which we are having problems in getting from the Western transnational drug companies, elevates the level of Indo-Soviet economic co-operation and gives it more substance.

The one advantage that we have in dealing with Soviet manufacturers is that they are not likely to back out of commitments made at the Government level. Specifically in respect of drugs, the public sector Indian Drugs and Pharmaceuticals Ltd. (IDPL) is assured of the technology transfer promised. The agreement also provides for technology sharing between manufacturers of the two countries, with IDPL getting from the Soviet Union know-how for the manufacture of rifampicin in exchange for supply of the technology for production of penicillin-G. The accord evidently is the beginning of a new area of co-operation between the two countries. Technology sharing in respect of other drugs has been discussed and seems likely to be taken up at a later stage.

An Indian delegation is due to visit the Soviet Union to discuss co-operation between the two sides in respect of chemicals and pesticides, though apparently there is not much scope for technology sharing in these fields. As of now, the idea is to prepare the ground for supply of chemicals and pesticides to the Soviet Union. But this can, over a period of time, be extended to technology sharing and to Indian manufacturers setting up shop on Soviet territory.

The Financial Express

PLEA TO EXEMPT DRUGS FROM TURNOVER TAX IN MAHARASHTRA

Indian Drug Manufacturers' Association and Organisation of Pharmaceutical Producers of India have made a joint plea to the Maharashtra government to exempt drugs and pharmaceuticals from the purview of turnover tax. Under section 9 of the Bombay Sales Tax Act, a turnover tax of 1.25 per cent is leviable on sales or purchases of goods exceeding Rs. 12 lakhs in value in a year.

The Act also stipulated that additional tax and turnover tax should not be allowed to be passed on to the consumers. The associations point out that as prices of most of the inputs are not controlled and there is no automatic mechanism for price adjustment, the turnover tax of 1.25 per cent is a severe blow to the drug industry.

The average profitability of the pharmaceutical industry is as low as 4% of the sales turnover. The turnover tax of 1.25% thus works out to over 30% of the industry's profitability. In the case of loss-making units the imposition of turnover tax would result in further deterioration of the financial position of these units.

The associations say that the turnover tax in its present form is bound to have a cascading effect as it is leviable at the stage of raw materials and then at the stage of intermediates, bulk drugs and formulations.

Although the manufacturers are not expected to pass on the turnover tax to the consumers, many manufacturers indirectly pass on the tax to the consumers in most of the industries. In the drug industry, as any price increase has to be approved by the Central government, drug units have to bear this burden themselves.

3 MEDICAL KITS DECLARED AS DRUGS

The Union Ministry of Health and Family Welfare, has declared disposable hypodermic syringes, disposable hypodermic needles and disposable perfusion sets as drugs with immediate effect.

In view of this declaration, all the manufacturers of these drugs of Gujarat State have been asked to approach the Office of the Commissioner, Food and Drugs Control Administration, Gujarat, for getting the manufacturing licence for the same latest by June 1.

All the dealers of these drugs who might not be having sales licence at present have also been asked to approach the concerned licensing authority of their area for getting licence of these items.

PEARL POLYMERS

Pearl Polymers has reported encouraging working results for the year ended March 1989. Sales have improved by 43% to Rs. 13.64 crores in the wake of much higher sales of its products. The operating profit has gone up to Rs. 68.17 lakhs against Rs. 21.04 lakhs. The company has announced a final dividend of 10% making the total dividend of 20% for the year.

The company plans to increase its production capacity of PET bottles and containers from the present 12 million to 20 million bottles at Mahad plant. Meanwhile, the company's public issue of 10 lakh equity shares of Rs. 10 each at a premium of Rs. 3 has been oversubscribed and will be closed on May 25.

ONSHORE BLOCKS

Mining leases for private oil companies

The Union Government has constituted a two-member expert group to hammer out the details of mining leases for private oil companies for onshore blocks, for which bidding in the fourth round will open towards the end of the year.

The group, which consists of Mr. Lovraj Kumar, former Secretary to the Union Government, and Mr. C.R. Jagannathan, ex-Chairman and Managing Director of Oil India Ltd., is expected to submit its report by July-end.

The group will look into the nature of mining leases that can be permitted to foreign companies under the Oil Fields (Regulation and Development) Act. The expert group will also examine the manner in which Indian companies can be considered for exploration.

In 1986, foreign oil companies had taken only nine of the 27 offshore blocks that were offered to them for exploration on production sharing basis. The group will identify the blocks out of the remaining ones that can be offered in the fourth round taking into account the possible work programme of the Oil and Natural Gas Commission (ONGC) and OIL.

Similarly, the group will also locate the onshore blocks that can be offered after taking into consideration the ONGC and OIL schedule for the next five years or so.

After the report of the group is received, the Ministry of Petroleum and Natural Gas is expected to forward it to the Cabinet for a decision. The guidelines for the fourth round will be formulated in the light of the recommendations of the group.

In the first round of bidding in 1980, 32 blocks -- 15 onshore and 17 offshore -- were offered for exploration by foreign oil companies. India had received bids from four companies for two blocks. The round resulted in one contract being signed for the Saurashtra offshore block with Chevron, USA.

During the second round in 1982, fifty blocks were offered -- 8 onshore and 42 offshore. Only one company showed interest in two offshore blocks, but no contract was signed as a result of this round.

In the third round, 27 offshore blocks were offered for exploration by foreign oil companies. The blocks were in Saurashtra and Kerala-Konkan basins on the Western coast, and Cauvery, Palar, Krishna-Godavari and Mahanadi basins on the East coast. The country had received 12 bids from seven international oil exploration companies for nine blocks. During the third round, the Government had adopted a flexible approach for the bids to get maxim response from foreign oil compani The bidders were given a seismic opt allowing them to relinquish an area the results of seismic surveys did enthuse them to take up exploratory d ling. Bank guarantees for the ent commitment were not insisted up Tax obligations were made easier a contract signature bonus and producti bonus paid by contractors were d pensed with.

INDIA MUST UPDATE MINING TECHNOLOGY

India can ill-afford to lag behind the fast growing technologies in bas metallurgical and mining industrie This message is brought home by t four combined international fairs on t foundry, metallurgical, mining a thermo-process industries held at Du seldorf from May 20-26.

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SSES INCURRED ON FOREIGN LOANS

Relief for ONGC sought

The petroleum and natural gas minis- has asked the finance ministry to rk out a scheme by which the Oil and tural Gas Commission (ONGC) is mpensated for the losses incurred on foreign loans on account of currency ctuations.

During 1988-89, ONGC suffered a ss of Rs. 463 crores on the foreign ans it had borrowed on behalf of the vernment. ONGC has argued that the vernment must compensate it by rais- g the crude price of Rs. 960 per tonne xed in 1981.

The petroleum and natural gas minis- y has initiated a dialogue with the nance ministry on this issue because NGC goes in for a large part of its for- gn currency borrowings only at the ehest of the latter. The practice so far as been to use ONGC's strong clout n the international capital markets to et foreign loans at competitive inter- st rates. These loans are then transfer- ed to the finance ministry for overnment use.

The petroleum and natural gas minis- ry has already committed to ONGC hat its case for compensation would be aken up with the government. The nemorandum of understanding, to be signed between the two shortly, would include a provision to this effect. The ministry's response indicates that the compensation would not be at least by way of an increase in the crude price hike. This issue is being examined separately by a group of ministry officials. A decision on a crude price hike would be taken independent of the compensation for losses incurred by ONGC on its foreign loans.

The finance ministry's initial argument is that ONGC is in a sound financial position to absorb these losses on account of foreign loans. Its post-tax profit in 1988-89 was estimated at Rs. 1,521 crores. This would go up to Rs. 1,602 crores in 1989-90 according to the latest projection.

The petroleum and natural gas ministry and ONGC argue that the profits are due to the organisation's higher efficiency and productivity. The goverment should reward the organisation for this instead of inflicting on it the burden of losses on account of foreign currency loans. According to ONGC, the losses are due to revaluation of the loans outstanding at the end of the year as well as payments made against the outstanding loans during the year. Such revaluation takes place as a result of the continued erosion in the value of the rupee vis-a-vis various foreign currencies in which ONGC borrows.

Such losses during 1987-88 were estimated at Rs. 87.45 crores. In 1988-89, these went up to Rs. 463 crores and if this is the trend, ONGC would incur higher losses in the current financial year. As at the end of March 1988, ONGC's total foreign loans stood at Rs. 2,384.56 crores compared to Rs. 1,949.15 crores a year back. Its expenditure in foreign exchange is however estimated at Rs. 1,388 crores in 1988-89. This would go up to Rs. 1,450 crores in 1989-90. Such expenditure includes payment for procurement of materials, equipment and services and repayment of loans with interest.

RCF, DEPT. OF FERTILISER SIGN MoU

The department of fertilisers has for the first time signed a memorandum of understanding (MoU) with the public sector Rashtriya Chemicals and Fertilisers Limited, Bombay (RCF), envisaging a degree of freedom and flexibility in the relationship between the govt. and the public sector undertaking. In order to achieve the planned objectives, the MoU ensures adequate attention to accountability of the undertaking as an instrument of economic development, according to an official press release.

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Concern over move to shelve Mangalore refinery project

The Centre's move to shelve the oil refinery project already sanctioned to New Mangalore has come as a big shock to the port city. The Kanara Chamber of Commerce and Industry, South Kanara Small Industries Association, and several other organisations have decided to launch a streng protest against the move and to submit a memorandum to the Centre urging it to have a second look at the decision and implement the project without any further delay.

If the government shelves the project, it will lose minimum of Rs. 8 crores. The Centre had made a provision of Rs. 30 crores in 1986 for the preparation of the detailed project report and to start other preliminary work.

Mr. M.K. Bagai, the then Chairman and Managing Director of Hindustan Petroleum Corporation has categorically stated that the Centre had sanctioned Rs. 30 crores for preparation of detailed project report.

According to official sources, though Rs. 30 crores had been released, a meagre Rs. 8 crores might have been spent so far. The expert committee which visited Mangalore, even identified the land for the refinery. The Centre then set up another committee under the chairmanship of Mr. D.V. Kapoor, the then Secretary to the Ministry of Industry to assess short and long range scenario of petrochemicals in the country based on end use analysis. The committee, in its report had strongly recommended a Rs. 1,000-crore project in New Mangalore.

The present indications reveal that Delhi is not interested in implementing the project. The Revenue Department authorities, said that so far, there has been no definite intimation or specific allocation of funds for land acquisition [illegible] Port had also prepared master plan costing Rs. 100 crores to create infrastructural facilities at the Port for the refinery. Although the plan had been submitted to the Centre about two years ago, it has not been approved so far.

A memorandum of understanding was signed in June 1987 by the Union Government with the co-promoters of the Mangalore refinery and petrochemicals project -- Hindustan Petroleum Corporation and Indian Rayon and Industries Ltd.

The project envisaged installation of facilities to refine crude oil initially with an annual capacity of three million tonnes with provision for further expansion to six million tonnes later. The unique feature of the proposed project was that it would have been the first refinery in India to be integrated with an ethylene cracker right at the grassroot stage.

The joint venture company, with equal participation of Hindustan Petroleum Corporation and Indian Rayon was registered as Mangalore Refinery and Petrochemicals Ltd. with its registered office at Bangalore.

Reputed engineering consultants were also employed to assist the project team. The experts even declared that the work on the project would be completed within four years after obtaining final approval of the government.

The decision to set up grassroot refinery at Mangalore had been taken in the effort to reduce the gap in petroleum products demand vis-a-vis availability from existing refining capacity in the country. The expert committee formed to advise on selection of the site had even opined that the liquid effluent, after treatment of standard specifications, could be released to Gurpur river Estuary. But in order to have a total fool-proof system for the sake of fisherf livelihood, it was decided to disch the liquid effluent, after treatmen away into the sea.

NFL VIJAIPUR UNIT FARES WELL

The Vijaipur unit of National F liser Ltd , which was declared a c mercial unit in July 1988, has sh impressive working results. During nine months of the financial year en March 31, 1989, the unit produ 5,31,527 tonnes of urea utilising per cent of its capacity. The despatch of material during this pe was 5,70,422 tonnes (104 per c capacity, according to an NFL rele

The unit has introduced a produ vity-linked incentive and gift scheme employees which has created a g impact in increasing the production productivity of ammonia and urea. Vijaipur unit is the first of the six inl located plants based on natural gas f Bombay High and South Bassein in West coast of Bombay.

The plant located in the backw "no-industry area" of Guna distric Madhya Pradesh is the first among th plants to go into production. NFL ready having three fuel oil-based pla with the commissioning of natural g based plant at Vijaipur has emerged the largest nitrogenous fertiliser p ducer of the country with an ann installed capacity of 24 lakh tonne

NFL has the following new schem for increasing the installed capacity the Vijaipur unit. Doubling of pres capacity of urea production from 22 tonnes to 4400 tonnes per day, purge recovery schemes for increas ammonia production up to 60 to tonnes per day from purge gases wh at present are burnt in reformer, carb dioxide recovery from reformer f gases to increase the urea producti based on additional ammonia fr purge gas recovery.

Three promoters for Assam refinery

ne proposed Assam refinery project now have three promoters and its al capacity will be raised from two ion tonnes to three million tonnes annum.

he three promoters are: Indian Oil poration (IOC), the Assam govern-t and IBP Company Limited. These e will invest in a new public sector pany in the Central sector, which implement the refinery project. The company will be made a subsidi- of IOC.

The shareholding pattern of the new npany will be worked out in such a y that IOC will have the majority re. The remaining 49 per cent will divided between the Assam govern-nt and IBP.

Earlier, the Assam refinery project s supposed to have only two promot-, namely, IOC and the Assam gov-nment. IBP Company Limited is the w participant. Both IOC and IBP nction under the administrative con-l of the petroleum and natural gas nistry and hence would invest in the oject on behalf of the Union Govern-ent.

No decision has yet been taken on hich agency would invest in the pro-ct on behalf of the Assam government. ccording to official sources, the State dustries Development Corporation is kely to be the agency through which e Assam government would invest in e project.

The equity contribution by these three romoters would be substantial, as the ost of the three million tonne refinery ould not be less than Rs. 1,000 crores. he refinery project is scheduled to be t up by 1994-95.

The decision to raise the refinery's itial capacity and to induct the third romoter was taken at a highlevel meet-ng held in New Delhi recently. The meeting was attended by the officials from the petroleum and natural gas ministry, the Assam chief secretary, Mr. A.P. Sarwan, and the Planning Commission officials.

It has also been decided that free land would be provided by the Assam government for setting up the refinery in an area near Jorhat. The exact location of the plant would be decided by a site selection committee.

The next stage of follow up action will be the preparation of a feasibility report of the refinery project. On the basis of this, approvals from the Public Investment Board and the Cabinet have to be obtained.

Earlier, the initial capacity of the refinery was pegged at two million tonnes per annum. This capacity was to be stepped up to three million tonnes subsequently, provided adequate crude oil was made available to it.

It was indicated at the meeting that enough crude oil is already available in Assam to sustain a refinery of a three million tonnes capacity. It was also felt that cost-wise a three-tonne plant was preferable to a two-tonne plant now. In view of cost escalation, the expansion plan would become prohibitive and the consensus was to start the plant with three million tonnes.

The decision to induct IBP Company Limited as the third partner was prompted by two considerations. First, the investment burden was required to be spread out among the three parties so that none of them is strained beyond their capacity to cough up the funds.

Secondly, the Assam refinery was seen as the right opportunity for allowing IBP Company Limited to invest in a refinery. IBP is also expressing its keenness to diversify into a manufacturing unit. At present, it is a traditional oil trading company engaged in marketing and distribution of petroleum products. It does not have any source of its own for supplies and takes the marketing products mostly from IOC.

Thus IBP's investment in the Assam refinery will provide it a stake in a refining unit and enable it to plan its sale of petroleum products with added thrust. IBP has already planned to raise its equity. Its profit in 1989-90 is expected to be Rs. 5.7 crores. Its sales in the current year are also likely to go up to Rs. 991.65 crores against Rs. 890.25 crores in 1988-89.

IBP at present has five plants -- a 20,000 tonnes explosives plant at Korba, a 10,000 tonnes mixed slurry plant at Singrauli, a 5,000 tonnes mixed slurry explosive plant at Kudremukh, a cryogenic container plant at Nasik and an LPG valves/regulator plant at Sewri in Bombay.

The Assam refinery was first proposed in 1985 when as part of the Assam accord, the home minister, had declared the government's intention to establish such a refinery with central assistance. Even though the refinery was originally envisaged to be set up in the private sector, the Assam government's failure to rope in a private partner forced the Centre to reconsider the project in the central sector.

It was decided in October 1987 that the Assam refinery with an initial capacity of two million tonnes will be set up in the public sector. The capacity could be raised to three million tonnes later. But the Assam government insisted that a new company should be formed to implement the project.

But the centre wanted an existing public sector unit's subsidiary to undertake the project, since this would be easier in terms of mobilising resources. After a series of Centre-State talks, it has now been decided to set up the refinery with 3 partners with the new company being made a subsidiary to IOC.

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PR FOR EXPANSION

NALCO to invite bids

The public sector National Aluminium Co. Ltd. is thinking of going in for limited tendering for preparation of detailed project report for expansion of its capacity, company sources disclosed recently.

The project investment board (PIB) of the Union government has given clearance for preparation of DPR for the Rs. 1,240-crore expansion, envisaging increase in the smelter capacity from 2.18 lakh tonnes to 3.33 l.t., that of the alumina refinery from eight lakh tonnes to 10 l.t. and of the bauxite mine from 2.4 million tonnes to 3.6 million tonnes, besides installation of three additional captive power units of 120 MW each in the present 5 x 120 MW (600 MW) captive power plant. According to company sources, NALCO had requested priority clearance of one of the new units, for which sanction of the Cabinet is to be sought in the next few weeks. The present power house itself has provision for the sixth unit.

No expansion of capacity of the company's port facilities in Visakhapatnam is envisaged since export of alumina is slated to be pegged at the present level of 3.75 lakh tonnes. It is, however, not known whether the company will increase the import of caustic soda to meet the needs of expansion or buy the additional quantity from the domestic market. The alkali manufacturing industry has for long been pleading for buying support from NALCO whose project had been conceived and executed on the basis of total import of caustic soda.

National Aluminium's expansion proposal includes the setting up of a 40,000 tonnes capacity continuous strip caster with cold rolling facilities. The company has already promoted in associationwith IPICOL and Mukand Iron a project for making rolled products. The basic engineering and feasibility report for the existing NALCO complex at Damanjodi and Angul had been prepared by Aluminium Pechiney (AP) of France, the technical collaborator, while detailed engineering had been done by Engineers India Ltd. Development Consultants (P) Ltd. was the managing consultant for the captive power plant.

NALCO, which obtained registration with the London Metal Exchange recently, has already established itself in the international market for its metal, besides exceeding the allocation for export of alumina last year. The company is set to commission the second potline in stages from June.

NALCO, which commissioned its power plant well ahead of commissioning of smelter and has been selling surplus energy to the State Electricity Board, is understood to be negotiating with BHEL for supplying equipment for the sixth power unit. BHEL had supplied the equipment based on Siemens design for all the existing units.

NHAVA SHEVA RENAMED AS NEHRU PORT

The Prime Minister, Mr. Rajiv Gandhi, dedicated the Rs. 878-crore Nhava Sheva port off the Elephanta Island, to the nation on May 26. The port has been renamed as 'Jawaharlal Nehru Port Trust'.

Calling for a new work culture, heralded by the fully computerised and automted container port capable of handling fertilisers and foodgrain through conveyor sytems, Mr. Gandhi said the satellite port would usher in rapid economic development in Raigad district of Maharashtra and the adjoining new Bombay township.

He assured the project-affected farmers and villagers that the concerned administration and the State Government would chalk out the compensation to be given to them, and vocational courses for the youth of the region to help them get employment locally. He hoped that with port development, infrastructure facilities like railways, and roads would be developed soon in the neighbouring areas. All these facilities would help in the uplift of people. The Prime Minister made an hour-long survey of the fully computerised and automated port visiting the cargo handling and computer terminals.

FOUR NEW BIS CENTRES OPENED

Four new offices of the Bureau of Indian Standards (BIS) have been established at Faridabad, Ghaziabad, Coimbatore and Vadodara to strengthen certification and propagation of standardisation and quality systems at different industrial centres in the country. Another branch office of the Bureau was being opened at Srinagar shorly.

This was stated by the Minister of State for Food and Civil Supplies Mr. Sukh Ram, while presiding over the fourth high-level meeting of the Bureau at New Delhi on May 24. The Minister informed that India had been admitted as a full certifying member to IECO Quality Assessment System for electronic components of the International Electro-Technical Commission (IEC).

NEW GAS FIND IN ASSAM

Natural gas was struck in a well at Banshkandi structure of the Oil and Natural Gas Commission (ONGC) in southern Assam's Cachar district. According to official sources the structure located about 10 km from Silchar, could produce 40,000 cubic metres of natural gas per day. Gas had already been found at Adamvtilla near Karimganj-Bangladesh border. Production testing had shown high prospects of gas reserve. Meanwhile, prospects of rich hydrocarbon in Mizoram have brightened with ONGC intensifying its exploratory work there.

Tata Chem, Tata Fertilisers merger defended

The amalgamation of Tata Fertilisers Limited with Tata Chemicals Limited was necessary because of the new parameters for determination of retention prices for fertilisers, announced by the Union government. Stating this at Bombay on May 25, Mr. D.S. Seth, chairman and managing director of Tata Chemicals, said the revision of the pricing policy made it extremely difficult if not altogether impossible to ensure viability of a new and 'stand-alone' gas-based project.

In an attempt to justify the amalgamation scheme, by which every member of TFL holding 100 equity or CCP shares will receive 17 ordinary shares of Tata Chemicals, Mr. Seth said the ratios and cash options had been worked out by experts and as such should be accepted. He did not agree with the view expressed in stockbrokering and other circles that the scheme was a bonanza for TFL shareholders and that the ratio should have been around 13 or 14 Tata Chemical shares for 100 TFL shares,

It is claimed that there will also be the advantage of addition of fabrication of equipment on a cost basis and that fresh capital required can be secured by TCL through the issue of convertible bonds at the appropriate stage.

Addressing a press conference, the chairman observed that the merger would be beneficial for Tata Chemicals which had surplus funds which could now be put to good use. Asked why Tata Chemicals had not taken up petrochemical projects instead, he said a fertiliser project was in the larger interests of the nation. Mr. Seth attributed the delay in the implementation of the project to "controversies symptomatic of the environment". He denied that the Tatas had dragged their feet over the venture and said various C tral and state government agencies, had primarily been responsible for delays, had found a scapegoat in Tatas to pass the buck.

Replying to a question on whet large subsidy burdens were a poten threat to the viability of new gas-ba plants, the chairman felt it could be case if the government did not rea that subsidy on fertilisers was actua a subsidy on foodgrains. For its p Tata Chemicals would seek protect in reducing its capital-related and op ating costs and needs for subsidy. As the new pricing formula, the subs burden on the exchequer on account a new gas-based fertiliser project, estimated in the region of Rs. 1 crores at 100 per cent capacity utili tion as against Rs. 220 crores on basis of the old formula.

Low debt-equity ratio

The revised pattern of financing outlay of Rs. 765 crores will result a low debt-equity ratio of 2.01:1 agai 4:1 previously as the equity capital w be rising by only Rs. 94.25 crores wh internal resources will be available Rs. 158.75 crores. Term loans in rupe and foreign currencies will account Rs. 512 crores.

A reduction in the burden of intere charges and a smaller increase in equ capital as a result of the merger will c tainly be improving the viability of fertiliser project but the resources TCL will be preempted in the proc and the management will have to concentrating on the implementation the Babrala project in the next 3 o years. The question also arises wheth Indo-Gulf Fertilisers and others will experiencing serious difficulties becau of the new pricing formula and wheth it would be necessary for the fertili projects sponsored by Zuari Agro Ind tries to adopt a similar course.

If the viability of the new schem cannot be ensured, further developme

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the industry in the Eighth Plan may t take place as visualised. It is, there- re, necessary to examine how the rden of subsidy can be reduced with- t affecting the prospects of the ferti- er industry and whether the efficiency the industry can be improved for wering cost and improving productiv- y. It will also be necessary to deter- ine whether the major inputs are earer than they should be.

TCL's impressive growth

Meanwhile the working results of Tata Chemicals for the year ended March 31, 1989 are impressive. On the basis of unaudited details, the turnover, including other income, has spurted to Rs. 291.64 crores from Rs. 230.40 crores, while the gross profit, before depreciation and interest charges, has crossed the Rs. 100 crore mark to Rs. 101.42 crores from Rs. 83.77 crores in 1987-88.

Interest charges were slightly higher at Rs. 33.68 crores (Rs. 35.37 crores). The sum set aside for depreciation is Rs. 17.51 crores (Rs. 16.45 crores) and taxation Rs. 14.50 crores (Rs. 8 crores). The residual profit is thus better at Rs. 35.73 crores against Rs. 27.20 crores. A dividend of 30 per cent, taxable, was paid on equity capital out of the profits for 1987-88.

Shareholders of Tata Chemicals, the chairman said, would benefit as the company would emerge stronger and more profitable. The earnings of Tata Chemicals, he said, would not be depressed during the construction period as the interest on loans would be capitalised during this time and the incremental share capital, upon merger taking effect, would be only Rs. 4.25 crores, which worked out to less than 10 per cent of the present share capital of Tata Chemicals.

While refusing to comment on whether Tata Chemicals would make a bonus issue in its golden jubilee year, this year, Mr. Seth felt the amalgamation would certainly not diminish chances of a bonus issue. He denied that the Karnal refinery project, being co-promoted by Tata Chemicals and Indian Oil Corporation as equal partners, would be taken over by Tata Chemicals.

OUTLOOK FOR FERTILISER INDUSTRY

The fertiliser industry has been worried about the change in the policy of the Central Government in respect of fixation of retention prices for individual units.

The norms for computing the return on investment were revised with a view to reducing the burden of subsidies on the Government.

The manufacturers too were expected to improve their operating efficiency. The Fertiliser Association of India and the major producers have been representing to the Government that the high cost of production was due to factors beyond their control and the new gas-based units were achieving a high operating ratio.

Many earlier entrants using naphtha or fuel oil as feedstock were also acquitting themselves creditably and profitability was satisfactory only in those cases where the operating ratios were higher than 80 per cent.

In fact it was complained by the Chairman of the Zuari Agro Industries that the full benefit out of the achievement of an operating ratio in excess of 100 per cent of capacity was not completely derived by the units concerned because the Government was making some adjustments which were resulting in a denial of some portion of improved profitability. Some helpful changes in the revised norms have, of course, been made recently though it is still felt that entirely new units having heavy capitalisation may not become viable in a short period.

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New indigenous products: NRDC proposes price product support scheme

The National Research Development Corporation (NRDC) has made a proposal to the Planning Commission for incorporation in the Eighth Plan of a time-bound price-product support scheme for any new indigenous product which was going to complete with a similar foreign imported product.

The NRDC managing director, Mr. N.K. Sharma, told some newsmen at Bangalore recently that the corporation had also proposed an insurance cover for the first time and that parallel discussion were going on with the General Insurance Corporation in this regard. The rationale behind this was that neither the entrepreneur nor the monitoring agency should lose out in case the technology failed due to other reasons.

NRDC has also made a proposal for the setting up of four regional offices during the Eighth Plan. The idea behind this was to ensure adequate linkages with the entrepreneurs at all stages of commercialisation of NRDC released technologies and processes. Replying to a query, Mr. Sharma stated that out of the 2,000 technologies licensed, 900 had gone into production. The cumulative output from the commercialisation of NRDC-released technologies is put at about Rs. 900 crore per annum. There had been some outstanding successes like in the case of Punjab Tractors.

NRDC, he said, had also developed technology in hi-tech areas where manufacturers in the developed countries were either now willing to lend the technology or were only prepared to do so at an exhorbitant prices. Mr. Sharma stated that in commercialising new technologies, NRDC has followed a policy of making sure that it was fully competitive in the first instance before licensing it to other entrepreneurs.

The KSFC managing director, Mr. Y. K. Puttasme Gowda, regretted that while national institutions in Delhi passed on technologies, they sometimes did provide the package of supporting s ces required at crucial stages of pr implementation. This he felt, was reason why many industries in Kar ka had fallen sick, especially the n cement plants which had adopted vertical-shaft kiln (VSK) technol recommended by a national institu in Delhi.

PDIL BAGS NFL CONTRACT

Projects and Development India (PDIL) has been awarded the cont for design, engineering, supply installation of a urea hydrolyser-c stripper at National Fertilisers Lt Nangal plant. The project, to be imp mented on a turnkey basis, is be taken up as a pollution control meas to treat waste water containing urea ammonia from the urea plant.

PDIL, which has won the job aga stiff competition with overseas p cesses, has developed its own kn how and will be executing the pro without any outgo of foreign excha either in the form of technology acq sition or import of equipment. The co pany has already installed one u hydrolyser-cum-stripper plant Namrup III which is working satisf torily, according to a PDIL release

IPCL SIGNS MoU WITH CHINE CORPORATION

A delegation of the Indian Pet chemicals Corporation Limited head by its chairman Hasmukh Shah signed a memorandum of understand with the Chinese petrochemicals cor ration, Sinopec, for the sharing information of technology transf technology absorption and co-operat in training. The memorandum signe Beijing on May 25 also provides promotion of consultancy servic exchange of expertise in product ap cation and development, technol upgradation, research and develop and environmental hazard managem The IPCL invited a delegation fr Sinopec to visit its facilities in In

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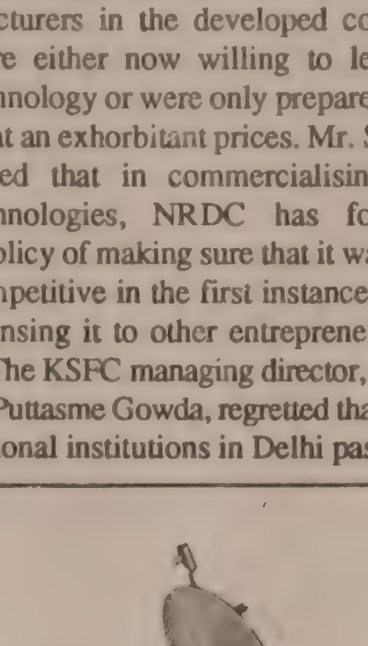

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nvironmental study of the Cauvery begins

An integrated environmental pro-amme of research on the Cauvery sbeen initiated by the Madras Science undation. The Rs. 91.72 lakhs pro-amme is sponsored by the Union inistry of Environment and Forests, d it will run for three years, accord-g to Dr. C.R. Krishnamurthy, Project irector.

For the sake of convenience and fective coordination of laboratory ork and field studies, the entire pro-amme will function at six centres -- in Karnataka and 3 in Tamil Nadu.

In the core programme of the Cauv-y project, water samples from selected tes will be analysed for physico-hemical parameters, and the data gen-rated will be used for developing athematical models that would be of ignificance for continuous monitoring f the river.

A comprehensive hydro-biological urvey of the river and its rich biolog-cal resources would be taken up by the ield stations at different points starting rom the river's origin at Talakavery in Mysore district to its estuarine network n Thanjavur district.

tudy in detail

Environment epidemiology and water-borne diseases related to the river will be studied in detail, and an inven-ory of pollution sources in the orga-nised and unorganised sectors and elated demographic studies will be pre-pared. Many universities and their affil-ated colleges close to the course of the iver are participating in this study.

Training workshops for the pro-gramme will be conducted at the Centre for Environmental Studies of the Anna University, Madras, and the Centre of Advanced Study in Marine Biology at Annamalai University. The Centre for Environmental Studies of the Anna University will study the heavy metal pollution in the river, and the Biochem-istry Department of the School of Bio-logical Sciences, Madurai Kamaraj University will work on the pesticide contamination of the water. The micro-biological studies will be done by the Microbiology department of School of Biological Sciences, Madurai Kamaraj University.

A principal coordinator will closely coordinate the work of the different centres, and send regular reports to the Madras Science Foundation. The foundation has set up a management team to assist the project director in monitoring and coordinating the programme. The Karnataka and Tamil Nadu State Boards for Prevention and Control of pollution are also involved in the programme, and Rs. 2 lakhs have been given to each in this connection, according to Dr. Krishnamurthi.

LEAD POISONING THREATENS GULF

A new environmental problem is worrying the Arab world: lead poisoning due to emissions from motor vehicles. Most petrol sold in Arab cities and town contains high levels of lead. The Organisation of Arab Petroleum Exporting Countries (OAPEC) has expressed concern over the sale of leaded petrol as the close co-relation between the use of leaded petrol and the levels of lead in human blood has been widely documented. Lead is used to raise the octane number of petrol.

Environmentalists fear that petrol consumption in the Arab world will reach 800,000 barrels-a-day in 1991 (compared to 300,000 barrels-a-day in 1980). Lead pollution is expected to rise concomitantly if steps are not taken to reduce the level of lead in petrol sold in Arab markets, according to OAPEC.

Calling for the use of lead substitutes such as methyl tertiary butyl ether as gasoline additive, an OAPEC bulletin urged the member countries to adopt steps to reduce the environmental pollution. It said lead compounds had a debilitating impact on more than one level as their poisonous effects permeate the human food chain as well as the air that people breathe.

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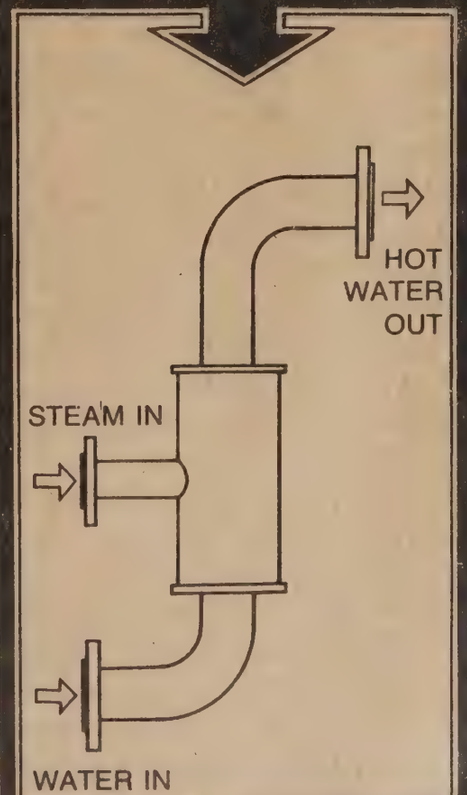

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Wave energy project work delayed

Uncertainty looms large over the much publicised wave energy project at Vizhinjam near near Trivandrum sponsored by the Department of Ocean Development of the Government of India in view of the inordinate delay in completing the work of the project and lately amidst rumours that the project itself may be abandoned.

The Rs. 106-lakh pilot project, supposed to generate 150 mw of power at peak monsoon season, was originally expected to be ready by June 1989. Thanks to the mishap while positioning the prefabricated concrete caisson which was to be installed on a platform on the sea bed a few months ago, the work has been at a standstill. The work in this connection is to be resumed only in November next.

However, Mr. K. Jayakumar of the IIT, Madras and in-charge of the project, when contacted, asserted that there was no question of abandoning the project. He admitted that work had been suspended for the time being and that it would be resumed by November next. The caisson had to be repaired. This would take two months and later, erection of the turbine and generator would require another three months. The projects should be on stream without further delay, he said.

According to him the mishap occured when the caisson constructed within the Vizhinjam harbour and tugged 400 metres away to the final site got positioned 20 metres away from the foundation and got titled as a result.

Informed sources said that there has been some resistance to the project lately from a section of the local fishermen. They have been complaining of the possible risks involved in the project and that this could be hazardous to their livelihood. The project engineers are understood to have approached the State Government-sponsored agency for exploitation of non-conventional energy, popularly known as ANERT, for the supply of solar markers in this connection. But ANERT has nothing to do with the wave energy project. The Director of ANERT, Mr. R.V.G. Menon, meanwhile, confirmed that they would be happy to supply the solar markers required for the implementation of the wave energy project. ANERT is also in the dark about any move to abandon the project.

The reported resistance from local fishermen was denied by Mr. Jayakumar who said that there was no fishing activity in the area.

FIS URGED TO FAVOUR SUNRISE INDUSTRIES

Federation of Indian Chambers of Commerce and Industry (FICCI) has urged financial institutions to extend priority status to high growth industries in their scheme of lending to ensure adequate flow of funds.

The industries, according to FICCI, which require priority treatment in view of their high growth potential include nitrogenous fertilisers, phosphoric fertilisers, caprolactum, nylon tyre cord and industrial yarn, polyester staple fibre, scooters, motorcycles, consumer electronics, industrial electronics, telecommunications and computers.

SOVIET UNION TO IMPLEMENT KARNAL REFINERY

Soviet Union has undertaken to implement the Karnal Refinery on a turnkey basis. Revised estimates for a turnkey contract are being finalised and are expected to be presented to Indian Oil Corporation and Tata Chemicals, the Indian promoters, within the next few weeks.

The Indian promoters are keen on a turnkey contract with a view to minimise the delay and avoid other hassles. The earlier plan envisaged the Soviets supplying equipment and materials and erection by Indians under Soviet guidance. This was how Mathura Refinery was set up. The Soviets want Karnal to become a model of an ideal refinery in a bid to efface the widespread not that the Soviet equipment is bulky inferior to western computer pa Towards this, the Soviets have allov the Indian promoters to go for west systems in areas where they are we computer systems for refineries example.

The product mix of the Rs. 1,5 crore project is also being shuffled view of the changing pattern requirements of petroleum products the country and the increasing dema for gasoline.

U.S. COMPANY TO EXPLORE OIL IN KRISHNA BASIN

An American oil company, Chevr International Limited, will start expl ing for oil/gas in the Krishna Godav offshore basin from July. Three offsh blocks have been assigned to Chevr under a contract with the Oil and N ural Gas Commission for exploration the Krishna-Godavari (KG) basin. Th are: KG-OS-1, situated east of region between Ongole and Kavali; OS-2, east of Nellore and Kavali; a KG-OS-7, east of Pithapuram a Vishakapatnam.

Teaming up with Chevron in t venture is another oil company, Texac The partnership between Chevron a Texaco is on a 50:50 basis. The Che ron had completed the seismic studi in KG-OS-1 and P-OS-2 and the fi and second wells will be drilled the respectively. The targeted depth of t first well is about 2,200 metres, wh it will be about 4,000 metres in the OS-2 block. The seismic studies ha proved to be interesting and Chevron hopeful about finding oil in the KG b sin. The Chevron, which is an intern tional oil company engaged in explo ing, producing, refining and selling o had earlier taken part in the drilling op rations in India. Another foreign oil International Petroleum (Bermuda) Li will be looking for oil in the KG o shore region and the block assigned it is codenamed KG-OS-4, south Bantumilli and east of Masulipatna

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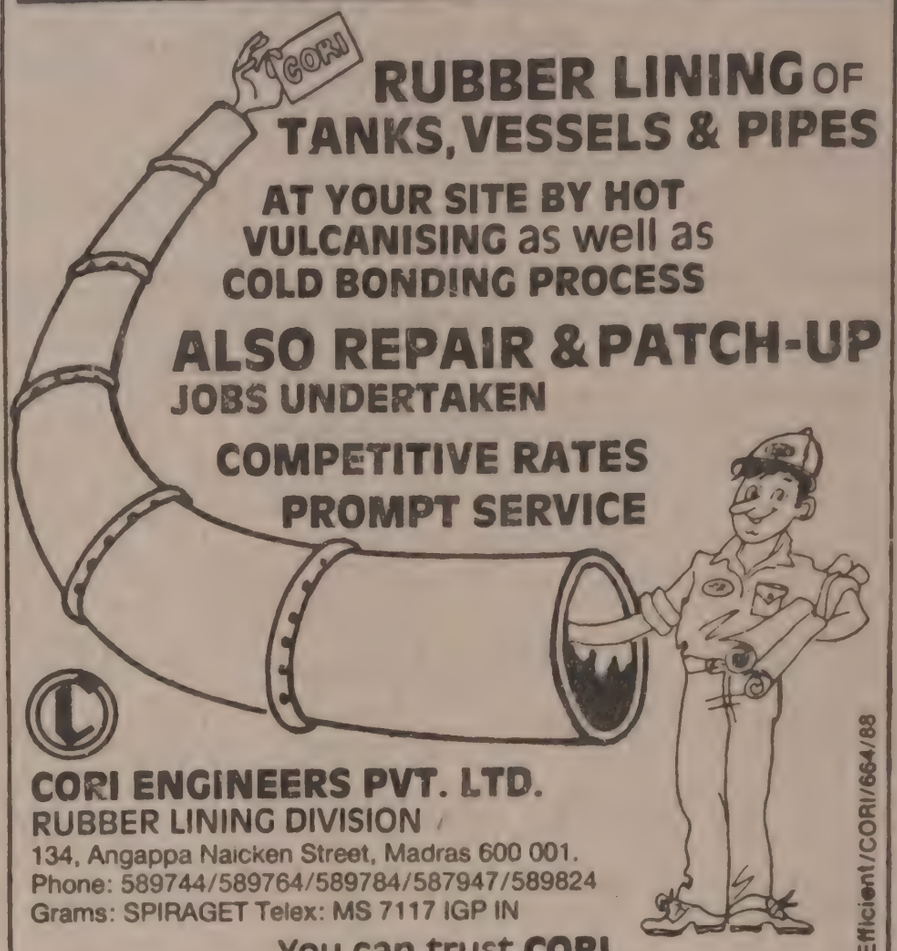

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OIL plan to develop Kumchai field

)il India Ltd. (OIL) plans to develop nchai structure in Arunachal Pra-h into an important field and get ut half a million tonnes of produc-n annually by the terminal year of the hth Plan.

To enable detailed production testing, L is setting up the early production ilities at the field. A 24-km long pipe-e of six inches diameter is being laid m Kumchai to Bordumsa for evacua-n of crude oil. Part of this pipeline s been laid under the turbulent river oa-Dihing. The total cost of the early oduction system will be around s. 2.24 crores.

OIL maintains a ropeway to transport en and light material across the river oa-Dihing. Only for about 3 months in inter, OIL can transport heavy mater-ls required for drilling in the Kumchai ructure utilising a bailey bridge.

A total of four wells have been drilled o date and it is estimated that the geo-ogical reserves of oil in Kumchai will e about 30 million tonnes of which ecoverable reserves will be 10 million onnes. Kumchai well No. 5 is now eing rigged up. This will be drilled to depth of 4200 metres. In the Eighth lan, about 20 development wells will e drilled in Kumchai.

The World Bank under its Oil India td. petroleum project has given a com-posite loan of $140 million in 1987. Four wells in the Kumchai area are being funded by the World Bank includ-ing Kumchai well no. 2 and well no. 3. The other two wells that will be funded by the World Bank are a super deep well that will be drillled to a depth of 6100 metres and another well of 4800 metres depth. OIL is procuring a heavy duty 300 HP drilling rig from Bharat Heavy Electricals Ltd. to drill this super deep well.

OIL plans to deploy two drilling rigs in the Kumchai area and both these rigs will be operated on management con-tracts.

The geological structure of the Kum-chai area is unique. Thick hark boulder beds right from the surface, the like of which have rarely been encountered elsewhere in the world, made the drill-ling very difficult and slow. Down below in the lower miocene formations (girujans) very high pressure conditions were encountered.

The first well at Kumchai area spud-ded in 1977 had to be abandoned at a depth of about 5460 metres after a blow out and subsequent stuck pipe. This well gave positive indications of presence of hydrocarbons below 5460 metres.

Since then, OIL had carried out a complete geological/geophysical review of the Kumchai structure integrating all the available evidence including the data gathered from the first well.

In Arunachal Pradesh, the company is already producing crude oil from a field at Kharsang, south of Dihing river in the Tirap district. The field produces about one lakh tonnes crude oil per year which is transported to the refineries. The Kharsang field has a geological reserve of 10 million tonnes of oil.

Discovery of oil in Kumchai has proved beyond doubt that there is high potential of hydrocarbons in Arunachal Pradesh. It suggests that similar struc-ture in the State which is a part of pet-roliferous Assam-Arakan basin could be oil/gas bearing.

SCHEME FOR PETROCHEM AT GLOBAL PRICES

The scheme to provide petrochemi-cals at international prices for export production has commenced. Indian Pet-rochemicals Corporation Ltd., which has been directed to set up a raw mater-ial bank for the purpose, has fixed the prices for PVC and ethylene oxide. The price for PVC is fixed at Rs. 14,000 a tonne and the price for ethylene oxide is Rs. 19,900. The PVC price for domestic production is Rs. 29,000 and that of ethylene oxide is Rs. 25,000.

IPCL is expected to fix international prices for polypropylene, low density polyethylene (LDPE), triethoxylene, solvent C-9, mono ethylene glycol (MEG), etc. shortly. IPCL has already released some quantity of MEG at the international price to the exporters.

The raw material bank would stock various polymers both indigenous and imported, which would be supplied to the exporters at international prices.

Informed sources in Bombay said that implementation of the scheme was delayed because the government was dragging feet on issuing a separate noti-fication granting excise exemption on these items. In the absence of a notifica-tion, the exporters are required to pay whatever excise on these items and cl-aim the duty drawback after actual exec-ution of the exports. The government has however assured the Plastics and Linoleums Export Promotion Council that the required notification will be issued shortly.

The Council has identified an idle capacity to the tune of 1.29 lakh tonnes in various sectors of the processing in-dustry which can easily fetch an addit-ional export revenue of Rs. 400 crores per annum. The current export of diffe-rent plastic products from India account for only about Rs. 70 crores. The Coun-cil and IPCL are of the view that if some basic facilities and incentives are given to the processing sector, many high-value products could be exported result-ing in full utilisation of installed cap-pacities of these units.

Many processing units are currently handicapped to take up export of certain plastic products as the individual import of some of the polymers is not viable. An item which has considerable export potential is the multi-layer film made of LDPE. There are 14 multi-layer film making units with an investment of over Rs. 2 crores each.

The capacity utilisation of these units is hardly 10 per cent at present. Besides this, there are over 60 units making stretch films, heavy duty films and some other high quality films with very low capacity utilisation. The Council has estimated that the export of these films could bring in foreign exchange worth Rs. 82 crores.

Big houses keen on oil sector privatisation

A number of large business houses are keen on early privatisation of the oil sector.

Following recent moves by the private sector to participate in the power generation programme there is a big demand for increased privatisation of public sector undertakings to ensure greater competitiveness and lower costs of production by the existing public sector units.

In fact, a list of PSUs in the oil sector identified for possible privatisation in the next ten years is enough to send shivers down the spines of the public sector top brass. The list includes 12 top public sector enterprises in the oil sector. These are the Oil and Natural Gas Commission, Indian Oil Corporation, Bharat Petroleum Corporation, Hindustan Petroleum Corporation, Bongaigaon Refinery and Petrochemicals, Cochin Refineries, Hydro Carbons India, Indian Oil Blending, IBP Company, Lubrizol India, Madras Refineries and Oil India.

According to sources close to some large houses, the thinking in industry circles is that privatisation of some public sector enterprises within a ten-year time-frame would help improve their efficiency. The reason for such thinking is based on recent experience in most parts of the developed and developing world, where privatisation of public enterprises has been initiated.

So far, although the Government has allowed private sector participation in offshore drilling, it is not known as to how it would react once a formal representation is made by the private sector.

In fact, an exhaustive note on privatisation of PSUs has already been prepared for deliberations at the forthcoming meeting of some corporate bigwigs. Among those who are likely to attend the meeting are representatives from the Birlas, Bang Modis, Goenkas and other top cor ate houses. It is not, however, know to how many of them would indi ually like to participate in the oil sec Once the deliberations are over ar consensus arrived at, a formal repre tation is expected to be made to Government.

The note has also identified an for grabs'' list of other sectors. Am these are the telecommunication sec including the Videsh Sanchar Nig and the Mahanagar Telephone Nig the air transport sector including, International Airports Authority, Ind Airlines and Air-India and the r transport sector. All possible expla tions as to why these sectors along w the oil sector should be privatised detailed in the note.

Regarding the oil sector and the enterprises identified therein for priv isation, it has been stated that the corporations together earned a net pr of Rs. 2,244.56 crores in 1987-88 a their total equity base was Rs. 928 crores. The total tax realisation fr these enterprises was Rs. 788.66 cro in 1987-88.

With the given equity base and profit, the earning rate works out to high as Rs. 25 per share of Rs. 10. T market value should be in the region 12 to 15 times that of the earnings. Ev on a conservative estimate, the oil ent prises command nearly 10 times th earnings, according to the note.

Under such circumstances, the thin ing in industry circles is that if the shares are sold in the stock market, t Government would be in a position raise as much as Rs. 22,450 crores. the other hand, the Government w lose less than Rs. 100 crores per ye which is the total amount of divide oil companies pay to the Governme As India is facing a foreign exchan crunch, instead of resorting to loa from the International Monetary Fu

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IF) under stringent conditions, the vernment can sell a minority portion the oil sector's equity to foreigners. is would help earn the requisite for- n exchange. If 10 per cent of the ares are sold to foreigners, the total eign exchange earnings would be .5 billion. This could be done in a ased manner over a five year period, cording to the note.

Finally, if the oil sector is privatised, e probability of cost of operation ing down would be high and conse- ently the profit would rise and help e Government earn more by way of xes.

In order to improve the viability of e enterprises, three alternative proaches could be adopted, according the paper.

First, an enterprise may be liquidated y way of closure and the assets sold. econdly, ownership of the enterprise ay be privatised through sale of assets the private sector, and thirdly, man- gement of the enterprise may be pri- atised using leases and management ontracts. Of these, the private sector ould apparently favour the last option.

According to the note, successful mplementation of a ten-year privatisa- ion programme would require gradual ransfer of management from the public the private sector. The process would lso have to be initiated in a manner so s not to cause an upheaval of the econ- my. As such, during the transition eriod, especially in the initial stages, he Government would have to continue olding the majority share in most sale- ble undertakings and the private share- olders allowed to elect one or two irectors to the board of directors. The anagement would also have to be iven complete autonomy in running the rganisation.

In the case of the oil sector, small- ized companies with equity of less than Rs. 30 crores, such as Indian Oil Blending, IBP Company, Bharat Petroleum, Hydro Carbons India, Lubrizol India and Cochin Refineries should be sold outright to the private sector in the first year. The management of such enterprises should be vested in the board of directors to be elected by the shareholders.

In some special cases, if the Government is unwilling to part with the management to fly-by-night operators, it could retain 26 per cent of the equity and have a vital say in all resolutions passed by the board.

In the next step towards privatisation, the Government can start selling equities of medium-sized enterprises like Hindustan Petroleum, Madras Refineries and others from the second year onwards. This could be completed in five years time, depending on the absorption capacity of the Indian capital market, according to the note.

In the first year, the Government may dispose 10 per cent of the equity to the private sector. The proportion could be increased gradually. Accordingly, private sector representation in management can rise proportionately. The representatives can be elected by shareholders. In case the capital market's absorption rate improves significantly, the privatisaton of medium-sized enterprises could be completed in three years. The Government could still retain 26% of the equity, if considered necessary.

In the case of large enterprises like ONGC, Indian Oil Corporation and others, privatisation could start in the third year. Such an effort could even be spread over a five-year period. To start with, 10 per cent of the equity could be sold in the private sector through stock markets. The private sector could then be allowed to elect one or two directors on the board of management. The share of private holdings could also be increased step by step to help the market absorb the large equity without creating a major disruption. Efforts would, however, have to be made simultaneously to expand the capital market by spreading the equity culture.

The note further observes that the latest survey by the Bureau of Public Enterprises shows, that PSUs, earned a net profit of Rs. 2,183.35 crores in 1987-88. Of the total 217 operating units in the public sector, 115 enterprises earned a total net profit of Rs. 3,902.12 crores and the remaining 102 units incurred a net loss of Rs. 1,718.77 crores.

The total equity of the 217 units was Rs. 35,411 crores. Hence, the net profit per Rs. 100 share was only Rs. 6.18. Analysing the survey data, it is clear that most profits had been garnered by units which enjoyed a monopolistic status and among them, the oil sector took the lead. Oil units earned a net profit of Rs. 244.56 crores. Another major profit-earner was the telecommunication sector.

NO MOVE TO PRIVATISE OIL SECTOR

There is no move on the part of the Government to privatise public sector undertakings in the oil sector, according to Mr. H.K. Khan, Secretary in the Ministry of Petroleum and Natural Gas. Talking to 'Financial Express'', Mr. Khan also ruled out the possibility of creating a holding company in the country to bring all the oil companies under one umbrella.

Mr. Khan said while private sector was being encouraged to join oil exploration efforts through joint ventures, there was no reason to hand over the ownerships of the public sector undertakings to the private sector. ''The methods employed by the Indian public sector companies in oil are comparable to the best in the world,'' Mr. Khan said. The financial performance of these companies is also ''excellent'', he claimed. Mr. Khan made these remarks in the wake of demand by some private sector industrial houses seeking privatisation of the oil sector.

Huge investments to raise petroleum output

The Union Minister for Petroleum and Natural Gas, Mr. Brahm Dutt, said recently that there are nine schemes on the anvil to increase the production of petroleum and petroleum products in the country.

Speaking at a function organised by Hindustan Petroleum Corporation Ltd. (HPCL) to mark the inauguration of a new housing complex for the Corporation employees near Visakhapatnam, Mr. Brahm Dutt said, "within the next three years we have planned to invest Rs. 700 crores under the scheme to meet the growing domestic demand for petroleum products. A sum of Rs. 43 crores would be invested in setting up captive power plants by HPCL by the end of 1990".

Mr. Brahm Dutt said apart from setting up of captive power plants in all HPCL units, plans have been approved for setting up a propylene recovery unit with a capacity of 23,000 tonnes per annum at a cost of Rs. 19 crores and a paraffin unit at a cost of Rs. 100 crores.

Mr. Brahm Dutt said additional tankerage facilities are being created in Visakhapatnam and additional capacity created to store more LPG, at a cost of Rs. 90 crores, to meet the growing demand for LPG.

A sulphur recovery unit would also be set up at a cost of Rs. 13 crores, he said, adding that to prevent environmental pollution Rs. 12 crores would be spent.

He said the pipeline in the outer-harbour would be extended at a cost of Rs. 25 crores to import LPG. The product pipeline between Visakhapatnam and Vijayawada would be taken up at a cost of Rs. 300 crores.

Regarding the refining capacity in the country, he said at present the domestic demand was 50 million tonnes per annum. But only 34 million tonne being produced in the country ONGC and Oil India. "Our strateg been to intensify our efforts for ex ration of oil and gas as both are equ important for us". Mr. Brahm further said, "if we can exploit available gas in the Krishna-Goda basin and the oil in the Cauvery b we can certainly reduce the pressur liquefied petroleum gas and the pres on forests for fuel."

The demand for LPG is increasin 7 to 8% per annum. By the end of century, the demand would be abou million tonnes per annum. It would a wise policy to intensify explora efforts to increasing the number survey operations and increase drill he said, adding that "besides, we h invited reputed international compan to explore our offshore areas also". F reputed companies have entered i agreements with the ONGC.

The Government has also decided set up three new refineries at Man lore, Haryana and Assam. Mr. Bra Dutt pointed out that the Mangal Refinery would have three mill tonnes of crude with a petrochemi complex at a cost of Rs. 1,500 to 1,6 crores in the joint sector. The details the project are being prepared and decision would be taken soon. Work h already begun on inland acquisition a creation of infrastructure facilities su as power and water.

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Highlights in Chemical Technology (Part-1)

WANTED CHEMICAL REACONS IN THE CHEMICAL PROSS INDUSTRY

' Unwanted chemical reactions in the emical process industry" is the procative title of B. Rasmussen's docal thesis submitted to Riso National boratory (D K 4000, Roskilde, Denark). She analysed 190 chemical cidents and reached the following nclusions for the distribution of uses:

) Reactions initiated by stray catalysts d contamination ... 20%
) Mixing the wrong chemicals ... 19%
) Incorrect process conditions ... 19%
) Use of the wrong temperature ... 9%
) Insufficient mixing ... 13%

The remaining 10% included such ctors as failure of auxiliary equipment, ccumulation of reactants and delayed r sudden start of reactions. 57% of the tal number of accidents accounted in atch process operation and 24% during olding or storage. Insufficient knowdge of process chemistry and thermoemistry was responsible for 34% of ccidents, design error contributed to 2% and operator error to 16%. Statistcal analysis of events of this type can e debated and even faulted but the tudy does highlight vulnerable areas of hemical process study. (*Chemtech* /1989, p. 130)

RECOVERING LITHIUM FROM THE OCEAN

There are more than 2.5 trillion tons of lithium in the world's oceans. The only problem is how do we get to it? Researchers Y. Ooi and S Kaloh have the answer: Adsorb it with a new type of molecular sieve prepared by the acid treatment of magnesium manganite. Molecular sieves for the adsorption of alkali metals are not new, but this one has unusually high selectivity for lithium in the presence of other alkali and alkaline earth metals, concentrating lithium in seawater by a factor of 26,000. The key to its high selectivity is magnesium which has an ionic radius equal to that of lithium. (*Separation Sci Tech* 1988, 23, 179)(*Chemtech*, 3/1989, p. 190)

AN INFORMATIVE PUBLICATION ON HYDROGEN PEROXIDE SAFETY PUBLISHED IN UK.

Hydrogen peroxide is extensively used in industry and its use is progressively increasing worldwide. Therefore, a publication on its safe use should be of great interest. A Health and Safety Executive report (published in UK) reviews potential fire and explosive hazards which might arise when using hydrogen peroxide. Causes of and preventive measures for various incidents are included, along with advice on safe storage and handling of hydrogen peroxide in this report.

The report is available free-of-charge from *HSE, Tech. Divn.*, Room 315, St. Anne's House, Bootie, Merseyside, L 203 MF, UK.

CONTACT PROCESS FOR PRODUCTION OF SULPHURIC ACID COMPLETES 100 YEARS

The Contact Process for the production of sulphuric acid celebrated its 100th year in 1988. The process which replaced the lead chamber process was developed by Rudolph Knietsch of the Baden Anilin & Soda Factory (now known as BASF). The use of platinum catalyst to convert SO_2 into sulphur trioxide revolutionised the production of sulphuric acid, allowing a purer product to be produced more cheaply.

In the past century, Kneitsch's process has been improved, notably in the use of vanadium catalysts in place of platinum, but the fundamental principles still apply.

Around 150 million tonnes of sulphuric acid are produced annually throughout the world and almost half of this is used in the fertiliser industry. (*Educa. In Chem*, 3/1989, p. 35)

PHOTOCURABLE EPOXYSILICONES MAKES A DEBUT IN USA

Technology to make epoxy-functionalized ultra-violet curable dimethyl siloxane resins have been developed by G B Silicones, Waterford, N.Y. a division of General Electric.

The form also has introduced release coatings for pressure-sensitive adhesive labels as the first product based on the new technology. The resins are compounded with bis (p-dodecylphenoxy)-iodonium hexafluoroantimonate, a photo-sensitive initiator of cationic polymerization. U-V irradiation converts the salt to phenoxyiodonium hexafluoroantimonate radical ion pairs.

The phenoxyrodinium radical cation attracts a proton from the environment and forms hexafluoroantimonic acid, which cross-links the siloxane chains through the epoxy groups. (*C & EN* 11/14/88, p. 44)

SIMPLIFIED SCALE-UP OF SUPERCRITICAL FLUID EXTRACTION ON THE HORIZON

Scale-up of Supercritical Fluid Extraction (SFE) will be simplified, when an off-the-shelf process devlopment unit (PDU) will be introduced in March 1989 by Marc Sims/SFE (Berkeley, Calif). Unlike bench-scale SFE devices, which only indicate process feasibility, the PDU is designed to simulate the operation of a full-scale plant. Standard features of the skid mounted device include; a 10-l extraction chamber and 5-l separator; a recycle

capacity of 1 kg/min of Carbon Dioxide solvent and a 40-l reservoir for the recycled carbon dioxide, a pressure rating of 5000 psi for the extractor; and a temperature rating of 100°C. Solvents other than carbon dioxide can be used, although flammable materials require an optional explosion-proof design. Cost is under $ 200,000 *(Chem Eng*, 3/1989, p. 17)

NEW PULPING ROUTES IN PAPER TECHNOLOGY UNVEILED

The drive for higher quality woodpulps with more energy-efficient processing has been demonstrated recently by two new pulp-making methods:

(a) The Stake Process from Stake Technology Ltd. (Oakville, Ont. Canada).
(b) The AllCell Process from Repap Enterprises Corp. (Montreal, Canada).

Stake is building a $ 96 million 100,000 ton/yr mill based on its 'explosive pulping process', which is similar to, but less energy intensive than chemothermomechanical pulping (CTMP).

Woodchips, pretreated with sodium sulphite and caustic, continously pass a reactor pressurised with 200 psig unto steam. After about a minute, the chips pass through a valve and depressurise explosively, creating a pulp. The process yield is around 90% which is comparable to CTPM, but with a pulp strength comparable to the much-stronger Kraft papers. Kraft yields are usually in the 45% range. In addition, energy consumption is reported to be 50-80% less than that of CTMP. In related news, an earlier decision by Nortek Forest Products (Edmonton Alta), to use the process at a new mill in Seskatchewan will lead to ground breaking in June 1989 for this new technology.

Repap Enterprises started up a 33 metric ton/day unit based on AllCell process last February at an existing mill in Newcastle, N B. The AllCell process features high temperature (200 degree C), high pressure (400 psig) pulping with an ethanol solvent (methanol could also be used). Digestion produces high-grade pulp, lignin and sugar, all in one vessel and without digestion catalysts.

" The new process is economic at one-fifth the scale of world-class Kraft mills, which often run 1000-2000 tonnes/day" reports Kendall Pye, president of Repap's Valley Forge, Pa. Research Centre. " In addition the absence of sulphite (the normal dissolution agent in Kraft pulping), produces a very high quality lignin product, which can be sold as a chemical feedstock." (*Chem Wk*, 3/1/1989, p. 31)

NEW SEMI-CONDUCTOR LASER DEVELOPED IN USA

Scientists at Sandia National Laboratory have demonstrated a high-efficiency, continous-wave semiconductor laser that operates at room temperature. The microscopic laser, a custom tailored single crystal with mirrors and lasing medium precisely grown by a molecular beam epitaxy, has a high quality near infra-red beam with small divergence --- about 2.5°, compared with about 35° for conventional semiconductor lasers --- according to Paul L Gourley, the Sandia physicist who heads the research effort.

The laser emits light through the top surface of the semi-conductor, a geometry that offers important advantages over other semi-conductor lasers, which emit horizontally from a cleaved wafer edge. Such a surface emitting laser allows use of large areas of a semiconductor chip and much better integration of optical and electrical components in a single planar system. The laser is one of a family of new optical devices being developed at Sandia using the crystal growth technology. Others include optical switches, optical modulators and optical detectors. (*C & EN*, 12/12/88, p. 22)

A NEW ORGANOCHROMIUM COMPLEX ACTIVATES MOLECULAR OXYGEN

An unusual organochromium complex that activates molecular oxygen has been prepared by chemists at the University of Illinois, Urbara - Champaign.

The complex is $(Cp^*CrBr_2)_2$, where Cp* represents a pentamethyl cyclopentadinyl group. This species is one of the few isolable complexes that clearly add oxygen to give an oxide according to researchers at the university.

In dilute solution, the complex reacts with oxygen within minutes to give Cp^*CrOBr_2, which was isolated in 97% yield. The chromyl bromide is metastable and most of it reverts to $(Cp^*CrBr_2)_2$, but molecular oxygen is not liberated. ^{18}O= labeling studies indicate that most of the missing oxygen ends up in polychromates and oxidised organic compounds. Indeed, phosphines readily abstract oxygen from Cp^*CrOBr_2. Thus, the complex seems to have potential as an organic oxidant. (*J Am Chem Soc*, **110**, 8234, (1988))

THE NATIONAL SCIENCE FOUNDATION (USA) REPORT FOCUSSES ON HIGH-TECH INDICATORS OF USA VIS-A-VIS JAPAN

A recent report after a study by the National Science Foundation (NSF) of USA gives comparative high-tech indicators of Japan vis-a-vis that of USA.

* Japan's science and technology resources (commitment to spending on education, growth in proportion to gross national product) are now on par with USA.
* The relationship of R & D to GNP is about the same for both countries; 2.79 to 2.8%.
* Industrial research accounts for 69% of all research in Japan and the percentage seems to be growing. The US ratio

government/industry research funding is about 50:50.
ndustrial R & D is 98% self-funded apan, 655 in USA (with US governnt providing the other 35%).
Defence accounts for only 1% of pan's R & D budget. In USA it is %.
apan has about a third of the number scientists as the USA does, but has ghtly more engineers per 10,000 of labour force than has the USA -- 187 183.
Japan's share of world scientific literure is 7%, versus 39% for USA. But pan's share of patents granted in USA ew from 4% in 1970 to 19% in 1986. Between 1965 and 1985, the US share world exports in high-tech goods fell om 28% to 24%, while Japan's share se from 7% to 19%.
Japan is becoming an exporter of chnical knowhow. Its percentage of ceipts-to-payments for technology lices increased from 14% in 1970 to 0% in 1985. But it still is paying record censing royalties of $ 1.3 billion 985) for foreign technology.
Japan's productivity increased 68% etween 1977 and 1986, whereas the S increase was 26% during the same eriod.

According to the NSF report, Japan as taken three important turns in its cience and technology policy during ne past 4 years. It has shifted its esearch focus towards fundamental esearch, reformed some of the more constraining" aspects of its R & D ystem and decided to participate more ully in the international scientific ommunity.

The USA could no longer provide the model, the Japanese concluded. Biotechnology, the software and hardware of information science and energy-elated research are sectors tabbed for mphasis in government and industrial esearch. But basic research will be stressed across the board, with universities, government agencies and corporations all cooperating --- or learning now to cooperate --- to set priorities. (*C & EN*, 12/12/88, pp 20-21)

NEW CFC SOLVENT ALTERNATIVES DEVELOPED BY ALLIED-SIGNAL (USA)

Allied Signal has developed a range of solvents to replace ozone-depleting chlorofluorocarbons (CFCs) currently used in cleaning applications in the electronic sector.

Allied reports the alternatives based on HCFC - 1416 have 90% less ozone depletion potential than CFC-113 which is currently used as an electronic cleaning agent. The US firm estimates that about half of the 75,000 ton/yr of CFC-113 currently used in USA could be replaced by the new range.

According to Allied, the new solvents will be available by mid-1992, pending the results of toxicological testing.

In total, the company expects to spend around $ 250 million developing and commercializing CFC alternatives over the next decade. (*ECN*, 3/20/89, p. 20)

RHONE POULENC TECHNOLOGY TO CUT DOWN NO_x EMISSION FROM NITRIC ACID PLANTS

France's Rhone Poulenc patented nitrogen oxide reduction process is carried out in two stages. Gas streams from nitric acid manufacture, initially pass through a high efficiency absorbtion column which records nitrogen oxide as nitric acid. The second stage, which is optional depending on the degree of No_x reduction required, is based on a catalytic reactor.

Selective catalysts convert remaining nitrogen oxide into nitrogen and water. Emissions can be reduced to meet international standards.

Rhone Poulenc has granted already seven licenses for catalytic reactors which reduce nitrogen oxide emissions from nitric acid plants. Reactors are being installed at ICI's Wilton and Ardeer sites in the UK, at Norsk Hydro's Glomf Jord facility in Norway, at Lonza's Visp, Switzerland unit and at Kemira's Rotterdam works in the Netherlands.

The agreements include licencing of the technology, but also encompass in some cases the provision of basic process engineering and assistance with commissioning of the new plants.

European regulations limit the emission of nitrogen oxide (NO_x to 200 ppm). While old plants are exempt from this standard, as soon as they are updated or expanded they have to comply. Rhone Poulenc claims its process allows companies to achieve emmission levels way below the EEC limit. (*ECN*, 2/27/89, p. 12)

FATTY ALCOHOL PRODUCTION BASED ON LOW PRESSURE OPERATION MAKES A DEBUT IN BELGIUM

Fatty alcohols production based on a less expensive process has begun at Synfina-Oleofina's new $ 36 million, 30,000 tonnes/yr plant in Ertevelde (Belgium). The firm, a subsidiary of Petrofina (Brussels), reports that improvements are due to a new copper/-chrome hydrogenation catalyst on a mineral support.

As in conventional facilities, natural oils and fats --- Olefina uses coconut oil --- are reacted with methanol to form methyl esters, which are then hydrogenated to make fatty alcohols. But the catalyst enables the hydrogenators to run under milder conditions; 200°C and 100 bars, rather than the conventional 250-300°C and 200-300 bars. The low pressure operation cuts investment expenses in the primary hydrogenation reactors, and results in overall project savings of 10-20%. In addition, the less

severe conditions produce fatty alcohols with better colour stability. (*Chem Eng*, 10/10/89, p. 19)

A NEW PROCESS TO COAT POLYETHERIMIDE UNVEILED IN USA

A new process for coating polyetherimide with metal could give the plastic resin new applications in injection-moulded printed circuit boards. G E Plastics (Pittsfield, Ma) and G E Corporate Research & Development Centre (Rochester, N.Y.) claim the new process provides stronger adhesion than traditional methods, suggesting a chemical bond between the substance and the metal plating.

Kenneth Browall, manager of inorganic systems at G E Corporate Research & Development, explains that through the use of proprietary chemicals, the process unlike traditional methods, does not damage the plastic surface or cause stress cracking. (*Chem Wk*, 3/15/89, p. 7)

A CHEMICAL AND BIOLOGICAL WASTEWATER TREATMENT PROCESS COMPLETELY CONVERTS CYANIDE TO CO_2 AND NITROGEN

Cyanide is completely converted to carbon dioxide and inorganic nitrogen in a chemical-biological wastewater treatment process recently commercialized by Radian Corp. (Austin, Texas) as an alternative to conventional alkaline chlorination, or treatment by peroxide or by sulphur dioxide and air. Called the CNC process, it does not generate cyanates (potentially toxic materials) or oxidize other wastewater constituents, as do many other methods, reports Radian.

In comparison with alkaline chlorination, reagent costs for the process are 50-60% lower, and no chlorine gas is required, simplyfying handling requirements and reducing safety concerns.

The CNF process mixes wastewater with a proprietary, aqueous-based nontoxic reagent in a chemical reactor, then passes the effluent through a biological oxidation process, where it is treated, clarified and discharged.

The route can reduce cyanide concentrations from 30-8000 ppm to less than 0.5 ppm. (*Chem Eng*, 3/1989, p. 17)

SUPERCRITICAL-FLUID CHROMATOGRAPHY TECHNOLOGY UNDER STUDY TO CUT SOLVENT COSTS

Supercritical fluid chromatography could cut solvent costs 5 to 10 fold reports Augusto Olalde, marketing director of Prochrom S-A (Champigne-rilles, France), which is conducting an industrial-scale tryout of the technology. Pilot tests are being conducted on an 8an-dia high pressure liquid chromatographic (HPLC) column, using supercritical CO_2 at 140 bar as the carrier solvent. Prochrom's president, Pierre Hzlaireau, expects an industrial-scale commercial unit to enter service by the end of this year.

Commercial use is forseen in difficult liquid-liquid separations where conventional HPLC purification is not applied because trace amounts of hydrocarbon solvent could remain in the product fraction, reports Olalde. With the supercritical method, all solvent flashes off as the product fraction returns to ambient pressure. In some existing HPLC separations, supercritical fluids would be more economic than conventional solvents (such as methanol or chlorinated hydrocarbons), which because of their high priority specifications, represent about 50% of the operating costs for typical HPLC units. (*Chem Eng*, 3/1989, p. 17)

STEAM EXPLOSION PULPMAKING TECHNOLOGY ON THE HORIZON

The steam explosion pulp-making technology pioneered by Stake Tec nology (Oakville, On.) is moving out the laboratory and into productio According to president Jeremy Kenda construction of an $ 85 million pulp m in Nipewin/Carrot River Seskatchew has already begun in June '88. Anoth mill will be started shortly on the Gasp Peninsula in Quebec, Canada.

'Pulp from the mills has already bee sold forward for the next five years reports Kendall. Both facilities will hav 100,000 tonnes per annum capacity. I the steam explosion process, hardwoo chips are impregnated with high pressure steam, which is then allowe to expand violently to separate the mol ecules of cellulose, hemicellulose an lignin.

The Seskatchewan plant to be oper ated by Stake licensee Nortech Fores Products is scheduled to come on strean in Oct. '90. Construction of the Quebe facility will begin in June '90 for Oc '91 start-up.

The Company plans to put up addi tional mills if the first two are success ful. (*Chem Wk*, 9/28/88, p. 25. *Chem Wk*, 3/29/89, p. 59)

CHEMIE LINZ (AUSTRIA) TO PRODUCE GLYOXYLIC ACID BY ITS NEW ENVIRONMENTALLY SAFE TECHNOLOGY

Chemie Linz GmbH (Linz, Austria has brought onstream a $ 18 million 2500 tpa glyoxylic acid plant, using proprietary ozonolysis/reduction technology. The process employs dimethyl maleate as a feedstock, which Linz reckons has significant environmental and other advantages over current processes based on nitric acid oxidation of glyoxal or acetaldehyde. Glyoxylic acid is an intermediate used to make vanillin and a number of other fine chemicals including perfumes, pharmaceuticals, dyes, plastics and agricultura chemicals. (*Chem Wk*, 3/29/89, p. 64

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DEVELOPMENT OF PHARMACEUTICAL & INTERMEDIATES INDUSTRY IN KERALA*

Dr. M.P. SHREEDHARAN

I am very much thankful to the organisers of this meeting r giving me an opportunity to place before you some of y impressions regarding the topic "Scope for development Drugs and intermediates industry" in Kerala. This subject s been discussed by various committees and forums on dif-rent ocassions.

India ranks first and foremost among the developing coun-ies, according to UNIDO (United Nations Industrial Devel-pment Organisation) in technological competence in the stablishment and operation of a modern pharmaceutical ndustry that matches the world's best in the range, variety nd quality of the products. About 250 bulk drugs are pro-uced in the country covering the entire gamut of therapeu-c groups. The Drug Industry has achieved an impressive rowth during the three decades of planning and develop-ent. The modest bulk drug production value of Rs.60 crores n 1960-61 has increased to Rs.355 crores in 1983-84, which s expected to cross Rs.500 crores by 1989-90. For the for-nulations, the figures are Rs.1200 crores in 1980-81 and 2000 rores by 1989-90. Although our country imports drugs and harmaceuticals for considerable value, the declining in the mport % of finished drugs is a manifestation of near self ufficiency in the requirements of finished products.

A few years ago one could not think of export of basic rugs. Because of poor technology, cost of production used o very high. With the advent of new technologies, the sit-uation has changed. The export of drugs and pharmaceuti-cals has registered a steady increase achieving the level of Rs.150.89 crores in 1983-84, which is expected to exceed Rs.300 crores by 1990. The situation in the advanced coun-ries is fast changing and with rigorous implementation of nti-pollution measures, the advanced countries are looking o the developing countries for a number of organic inter-mediates. This opportunity must be fully exploited by the ndian Sector.

The pharmaceutical industry more than any other indus-ry is a research based innovative industry. In India, initially he emphasis was on the establishment of large scale facil-ties for production in the quickest possible time by utilising he technology obtained from abroad. The industry has not nly adapted and improved upon them, but has also done sub-stantial work in areas which are more urgent and relevant to our needs such as process research, product development, formulation research, packaging and import substitution.

The Patent Act 1970, which replaced an older statute of 1911, had a far reaching impact on the Indian Drug Indus-try. It has become possible for the national sector to develop suitable technology for a number of basic drugs. The last 15 years show a strong resurgence of the national drug industry which introduced many new drugs for the first time in India.

Although progress has been made by the drug industry which is laudable, it is still below expectation. While the target for formulations has been achieved that for bulk drugs and intermediates is falling short. From the figures available, bulk drugs and intermediates worth Rs.162 crores have been imported in the year 1983-84. This is about 50% of the coun-tries requirements. Improvement in the situation is noticed in the later years, but still we depend considerably on imports.

This being the situation in national level, let us examine the Kerala position. The total requirement of drugs in Kerala per year is estimated to be Rs. 60 crores worth. This figure is expected to increase year after year.

The drugs and pharmaceutical industry in modern lines is almost non existent in Kerala, but for the state owned "Kerala State Drugs and Pharmaceuticals Ltd". with a formulation unit and a Vitamin A plant. A few more small scale man-ufacturers are doing the formulation work. There is not any appreciable bulk drug manufacturing except for a few small firms producing some common bulk drugs. The scale of man-ufacturing is small and production is only nominal. The total value of drugs produced by various firms in the state would amount to only less than Rs.5 crores. Kerala State has not felt the development which is taking place in this industry. Even compared to other southern states Kerala is lagging much in this field. States like Tamil Nadu, Karnataka, Andhra Pradesh with infrastructural facilities comparatively lesser than Kerala for chemical and pharmaceutical industry have progressed very fast.

Kerala has got the basic advantages for setting up units for synthetic basic drugs and drug products and intermed-iates of vegetable origin. Let us examine these.

Natural Products: Kerala offers good potential for exploi-

* Paper presented at the seminar on Potentials, Problems and Constraints for Growth of Chemical Industries in Kerala organised by Chemical Indus-tries Association, KSIDC and Institute of Chemical Engineers, Trivan-dum, on 18-2-1989.

tation of drugs products and intermediates of Vegetable origin. We have vast areas of forest land where medicinal plants are grown in abundance. Some of the plants are 1. Rauwolfia 2. Datura 3. Dioscoria 4. Vinca Rosa 5. Beladona 6. Nux Vomica 7. Beri berin 8. Gall nuts 9. Lemon grass 10. Tapioca 11. Papaya 12. Tea and many others which are mainly used in the Ayurvedic preparations.

Industrial Raw Materials: Sufficient quantity of heavy chemicals like sulphuric acid, hydrochloric acid, sodium hydroxide, chlorine, ammonia, calcium carbonate, lime, sodium sulphate, ammonium chloride, zinc metal, cadmium metal etc. can be obtained from local units. Organic chemicals like phenol, formic acid, formaldehyde, and acetone are also available here. Benzene, xylene and toluene are expected shortly from Cochin Refineries. Many other raw materials are available from neighbouring states.

Infrastructural facilities like good quality water, easy transport and communication facilities, and outlet for disposal of harmless effulents and industrial waste are easily available. Climatic condition are also favourable.

For thermal heating, furnace oil, petroleum gas, firewood, rice bran, saw dust etc are available locally. Lignite coal can also be obtained from the neighbouring states. Well developed industrial estates and industrial development areas are readily available in the state for setting up the units.

Till recently, electricity was a surplus item, in Kerala. At present, some shortage is experienced. Arangements are being made for extra power generation which will be able to solve this problem. After all, pharmaceutical industry is not a power oriented one.

TECHNOLOGY

By its very nature basic drug industry is highly technology intensive. For the production of various varieties of drugs indigenous technology is available. Foreign technical collaboration can also be based. This should be based on specific advantages, and should be limited to the minimum as it is comparatively costly.

Very often it is the choice of proper technology that contribute maximum to the success of the unit. The choice of raw materials and synthetic routes to be followed makes a lot of difference in the whole of the project structure. Therefore, before adapting technology, whether indigeneous or foreign, a proper scrutiny and verification to suit the Kerala conditions will be worth while. Proper modifications can be possible in the initial stage itself which will help a lot later. Scientists and technologists working in this field have been highly successful in the work.

TECHNOLOGISTS AND MAN POWER

As the processes are technology intensive the main v force will be technologists, science graduates, people general education i.e. S.S.L.C. & Pre-Degree, skilled eng ering people and general work men. Generally the rati the general workmen to the other group comes to 2:3. I to electronics, this industry absorbs the maximum nun of educated people.

Kerala can provide all these types of man power. It fact that in Kerala there are very few Scientists and Te nologists working directly connected with pharmaceutic chemical industry. But a good percentage of people work in this field with proven records in other states are Keral Many of them will be prepared to return to their home s if proper openings are available.

Educational unemployment is maximum in Kerala. Ph maceutical industry can help to dilute this situation than other industry.

FINANCE

The most important aspect for any industry is the finan Apart from entreprenuer share, the backing of financial in tutions is a must. People connected with this industry in sta like Andhra Pradesh and Gujarat where this industry flourished in a big way, praise the backing of financial in tutions. In this connection I repeat the words of Dr.A Reddy, a successful technocrat of Andhra Pradesh". T industry had the backing of financial institutions. These in tutions have gone all out to support the industry even thou in the initial stages these institutions themselves were ha dicapped by the absence of technical evaluation skills. course now this is compensated by recruiting technical p sonnel from the drug industry" This is his tale when he enu erates the salient features which helped the tremendo growth of pharmaceutical industry in his state. It will proper for Kerala also to proceed in these lines.

After these general points, I now switch on to certain p duct lines suitable to Kerala. I would like to state that no s cific recommendation can be made by an individual o particular agency with regard to the choice of basic drug m ufacture. The analysis made can be taken as guidelines bef venturing into the field. Lot of groundwork has to be do by the individual promoter before the decision is taken set up a basic drug project.

NATURAL PRODUCTS BASED INDUSTRY

Items available in this sector has been already listed 1960's ! D.P.L.(A Govt. of India undertaking) started

plementation of a project at Niriyamangalam for manu-cturing phytochemicals and pharmaceuticals based on indu-rial wastes like tea-waste and other forest products. This as one of the Russian aided projects to India. The project as shelved due to some reasons.

In 1982, I.D.P.L. made another effort to start a unit in erala for manufacturing caffeine from tea wastes and P-none from lemon grass. U.S.S.R. promised to provide the chnology and purchase any amount of these finished items. fter preliminary studies and assessment of raw materials vailability, few technologists were sent to U.S.S.R. for cquainting the processes. But Dr. Behl, who was then the . & M.D. of I.D.P.L. and who was the main interested person ehind this project could not continue in his office to imple-ent the project. Nothing is heard about this project after-ards.

The scope for a phytochemical project is very good in the igh lands of Kerala. The availability of tea waste is still there. emon grass cultivation has reduced to some extent. But this an be improved by organised cultivation providing incen-ives and subsidies to farmers and fixing support prices for emon grass.

Another important raw material available from forest is all nut, an important source for gallic acid and gallamide. Gallic acid is the primary raw material for Trimethoxyprim. Acid and amide are used in the drugs industry as well. The xtraction of tannic acid from gall nuts and further proces-ing to gallic acid and amide should be performed at a place where temperature is low, to prevent fermentation.

A project can be implemented in the high ranges of IDUKKI district, WAYANAD district with proper capacity o produce P-ionone, caffeine, gallic acid and gallamide.

Suitable projects for the production of herbal extracts like Nux Vomica, Beladona, Rauwolfia, Beriberin, Papain, Vinca Rosa etc. may be considered. In these cases also organised cultivation of the medicinal herbs should be taken up.

Starch Dextrin and liquid glucose manufactured from Tap-oca are in good demand for textile units. Small scale units at different places in Kerala where tapioca cultivation is con-centrated can be considered.

SYNTHETIC DRUGS

Most of the drugs prepared by synthesis involves multi step reactions and use of different organic and inorganic chem-icals. It is very difficult to obtain all the reactants at one place. The quantity of raw materials will be comparatively low com-pared to the prices, so the cost of transportation becomes a negligible contributing factor in the cost of production. Specific advantages may be there with regard to the availability of infrastructure and proximity of bulky raw materials production centers. Considering these purpose will be based on the following merits of the individual firm.

1. Items facing short supply
2. Import substitute items
3. Export oriented items
4. Items expecting demand in future.

Keeping in mind all these aspects the items identified for commerce/manufacture in Kerala are:

1. Calcium pentothenate and B6 in the Vitamin series
2. Ibuprofen, dextro propoxyphene, fenoprefen, naproxen, paracetamol diclofenac, diffunisal in the algesic antipyretic and anti inflammatory group.
3. Pyrazinamide and ethambutal in Anti—T.B. Group.
4. Methyl dopa, Verapamil, Nifedipine, Diltiazem, Tinidazole, Timmololal, bio-sorbid nitrate in the cardio-Vascular drugs group.
5. Caffeine, theophylline and Salbutamol in the antiasthamatic group.
6. Dapsone and clofazinime in the antilaprotic group.
7. Chlorpheniramine antihistaminic.
8. Pyrantal pamoate—Anthelminatic.
9. Sulphamethoxyzone and Sulphadoxin in the Sulpha drugs.
10. Chlorambucel and Cyclophosphamide in the antineplastic agents.
11. Cimetidine a new drug introduced in the treatment of deoginal and gastric ulcers.
12. In the Drug intermediate field the nitrochlorobenzene, nitrotoluenes, Isobutyl benzene and hydrazine hydrate are promising items to be considered. The local availability of raw materials and import substitution being the main advantages for these products.

There is scope to set up atleast 4 synthetic drug units in Kerala with product mix not less than 4 items each. If the number of items are minimised still lower the survival of the unit become difficult because of;

1. Unhealthy competition from other manufacturers.
2. Unexpected and price rise scarcity of raw materials connected with a particular item.
3. Imported materials flooding the market and the tough competition created.
4. Introduction of better and cheaper substitutes.
5. Finally the extradition of the item from drug use due to side effects and toxicity.

A combined project of basic drug and industrial chemical units based on benzene, sulphuric acid, chlorine and sodium

hydroxide to manufacture chlorobenzene, oil and p-nitrochlorobenzene o and p - anisidine, paracetamol, clofrozinine. Isobutyl benzene and Ibuprofen will be a proper venture.

Hydrazine hydrate (raw materials urea, sodium hydroxide and chlorine) can also be considered.

IMPLEMENTATION

Now let me express certain views regarding implementation side. I can't expect a Government of India body or a business house or an individual from outside Kerala to undertake the task of implementing some projects in this field in the near future. Efforts have been made on many occassions to attract people from outside Kerala for this job, but without any positive results. Generally the attraction of this group is always towards completed projects. Now we have to find out the entrepreneurs from within the State. The first choice is the Government itself. The Government body K.S.I.E. should come forward to set up a couple of units with proper number of items and capacities. These items can be fed to their formulation unit at Alleppey. This project should become the nucleus for further projects to come in. As IDPL became a breeding unit for the sudden growth of pharmaceutical industry in Hyderabad, these units will help Kerala for its development of pharmaceutical industry. The second choice to take up the job is co-operative sector. This is a field wh this sector can do well. The educated unemployed people find an opening by this.

K.S.I.D.C. should venture for co-promoted and sponso projects in this field. Encouragement must be given in sector to technocrats of proven ability and who can spe head the development of technology on their own. Thi applicable to financial institutions like K.F.C. and banks a

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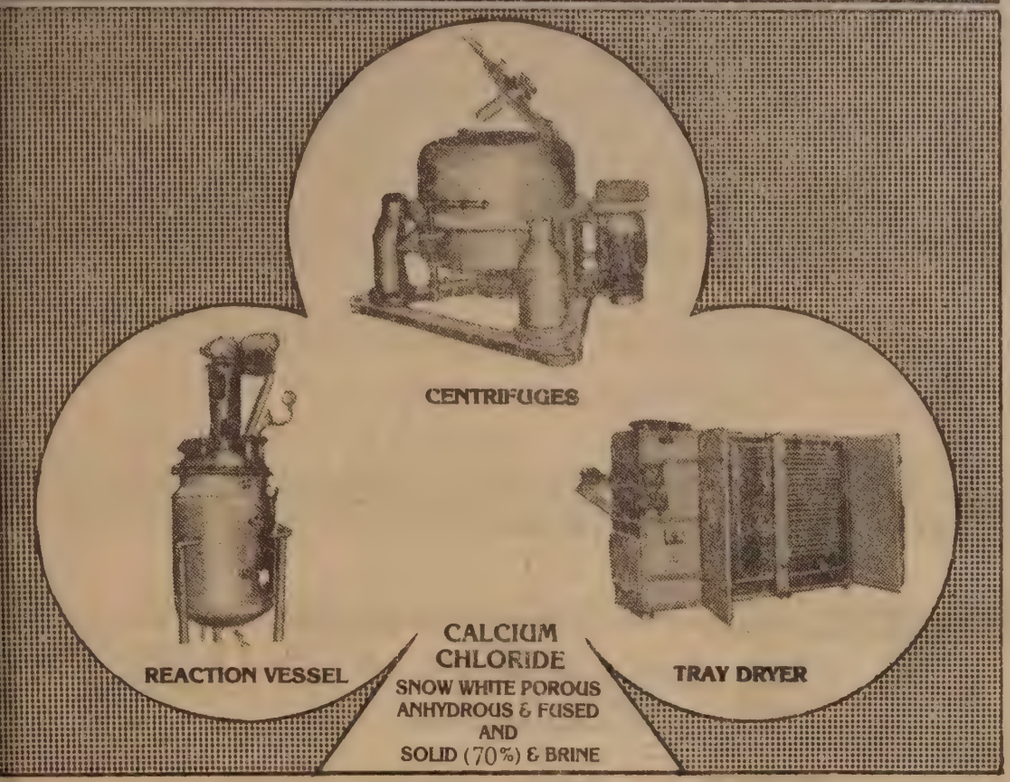

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Science Briefs

WARD-WINNING RESEARCH PHOTOSYNTHESIS

It was only through the exploitation light for the development of matter at life on earth was able to gather omentum and completely change the ce of the planet. Although the essen- ls of photosynthesis have been known r some time, the decisive element of is process, the conversion of light ergy into electric energy, has only w been fully comprehended due to e analysis of the fine structure of biological photocells''.

Robert Huber, Johann Deisenhofer nd Hartmut Michel were awarded the 988 Nobel Prize for Chemistry for ork in the photosynthetic processes. At e Max Planck Institute, which is caded by Dr. Huber, Dr. Michel and rof. Deisenhofer succeeded in making structural analysis of a membrane nked to a protein complex, which pened up completely new possibilities n structural research.

wo step process

In every photosynthesising organism, amely plants, algae, and certain bacte- a, photosynthesis takes place in two eps. First, the particles of light (pho- ons) are captured and then their energy converted into electrical and chemical nergy. This process, termed light reac- on, is followed by darkness reactions nat are independent of light. At this age, the energy enters the metabolism f the vegetal or bacterial cell as bond- ng energy in the process of building up arbohydrates (sugar) from carbon diox- de and water. This is the first link in e food chain supplying energy for man nd beast. The oxygen necessary for rocessing food is generated as a side- roduct during the process of photos- nthesis in plants and algae.

The light reactions take place in pho- synthesising membranes which cap- re and collect the photons and, by separating electric charges, generate a difference in voltage between the inside and the outside of the membranes as well as a difference in the concentration of hydrogen ions. By determining the separate charges in phosphate compounds, the energy content of the gradients of charge and concentration is stored for future darkness reactions.

Besides lipids, the photosynthesising membranes consist of complexes of protein and pigment molecules. Scientists succeeded in clarifying the spatial structure of two protein-pigment complexes, namely that of the light-collecting protein and the photosynthetic reaction centre. Their insights into the internal structure have revealed the elementary mechanisms of energy conversion.

It was easier to investigate the light-collecting proteins than studying the reaction centres, since the proteins were taken from cyanobacteria where they sit like antennae outside the photosynthesising membrane. Their function and internal structure are comparable to the light-collecting proteins of vegetal cells in the membrane.

Each antenna comprises three to four layers of protein-pigment complexes and placed one upon the other like discs; each layer contains 18 pigment molecules. Six antennae with more than 100 pigment molecules act as a light-collecting organ for one single reaction centre. The pigments act as light conductors; excited by light, they pass on this stimulus through the various layers from pigment to pigment to the photosynthesising membrane. This transmission of energy, which takes place within a few billionths of a second, is almost loss free, as the ambient protein structure keeps the pigment molecules in the most advantageous position in relation to one another.

Light trap

The antennae also constitute a light trap of sorts, because the pigments at their tips absorb shortwave light, while those further down absorb slightly longer waves. Since shortwave light possesses more energy than the long-wave a slight energy gradient is created which ensures that a photon, once captured, is only transmitted to the membrane within the pigment chain.

The scientists discovered that the reaction centre consists of four proteinic sub-units enveloping different pigments grouped in given positions in relation to one another. A key role in the transmission of the charge through the photosynthesising membrane is played by two pigments in very close juxtaposition.

Under the influence of light energy this pair releases an electron above the membrane into the interior of the cell. It carries a positive charge and reverts to its non-excited, basic condition by taking in a new electron that is directed from the other side of the membrane.

-- The Hindu

FUNDS WASTED IN MANY LABS: CSIR

The audit report of the Council of Scientific and Industrial Research (CSIR), has criticised several CSIR laboratories for blocking funds, ''avoidable'' and wasteful expenditure and project delays.

The report released recently has revealed 86 instances of equipment remaining uninstalled or under-utilised in various CSIR laboratories for more than a year, leading to an idle investment of about Rs. 674 lakhs.

The report said there were delays in the installation of machinery because of in-house failures in calling for the infrastructural facilities, which blocked nearly Rs. 501 lakhs and affected the early completion of research projects. There were also delays in getting spares or removing defects after the installation

of the machinery, which led to the under-utilisation of the equipment, the report said.

The report said the CSIR's National Metallurgical Laboratory in Jamshedpur exhibited an inflated income in its account. The income and expenditure statement of the laboratory showed that the income was inflated, whereas there was an excess expenditure of Rs. 20.25 lakhs, the report said.

The account of another CSIR laboratory, the National Aeronautical Laboratory in Bangalore, also revealed a Rs. 57-lakh excess expenditure over income, the report said. On the proposed shifting of the Structural Engineering Research Centre from Roorkee to Ghaziabad, the report said the shifting had been unsuccessful even after four years.

Following a decision in October 1985 to begin research activities in Ghaziabad, Rs. 2.9 lakhs were spent in hiring accomodation for offices, laboratories and computer rooms. However, no research activity has begun in any hired accomodation and laboratory and the computer centre has not been set up. The entire expenditure of Rs. 2.9 lakhs was wasteful, the report said.

Equipment, the library and the workshop at both places are being put to minimal use. In another case of wasteful expenditure, the report noted that the Central Scientific Instruments Organisation in Chandigarh printed 1,200 copies of a directory of instruments, but after nearly 4 years only 572 copies had been sold. The infructuous expenditure worked out to Rs. 2.37 lakhs, the report said.

-- **The Financial Express**

SWEDISH PHYSICISTS REPEAT COLD FUSION EXPERIMENT

Swedish physicists said that they produced a burst of neutron radiation in a room-temperature experiment, repeating the work of two chemists who claimed to have achieved cold fusion in a jar.

The scientists at the Manne Siegbahn Institute for Physics said their method was similar to the experiment that chemists Stanley Pons and Martin Fleischmann said they conducted at the University of Utah.

In March, the two claimed to have produced sustained fusion in a jar at much colder temperatures than previously thought possible. Repeated attempts by other scientists to duplicate the Fleischmann-Pons experiments have failed.

Birger Emmoth, Magnus Jandel, Irena Gudowska and Waclaw Gudowski said in a press release they ran an electrical current between platinum and palladium electrodes immersed in heavy water containing deuterium, a variety of hydrogen.

The results indicate fusion reactions can occur at low temperatures in the electrode material palladium. This gives certain support to Fleischmann and Pons ideas.

HIGH EFFICIENCY AMORPHOUS SILICON SOLAR CELLS

The Thin Film and Amorphous Materials Group in the National Physical Laboratory, New Delhi, under an all-India co-ordinated sponsored project of the Department of Non-Conventional Energy Sources (DNES), has recently developed thin film amorphous silicon solar cells having 11 per cent efficiency. The solar cell comprises a glass substrate coated with a textured layer of tin-oxide (TCO), which is electrically conducting and optically transparent, followed by layers of boron doped silicon carbide (p-layer), intrinsic hydrogenated amorphous silicon (i-layer), phosphorous doped amorphous silicon (n-layer) and a highly reflecting silver layer.

The p-i-n solar cell structure is sandwiched between the two conducting layers of textured TCO layer and reflecting silver layer which enhan confinement and hence optimal c sion of incident solar energy into trical energy. The silicon carbid is known as "window layer" si transmits a wider spectrum of in solar energy compared to simple doped amorphous silicon layer.

The NPL group has also d strated fully integrated thin film cell panels in 10cm x 10cm size f ious consumer applications like held radios, cassette players and c ators. In these panels a number of square centimetre cells are connec series (positive of one to the ne of other). Each cell individually ers about 105 milliamperes c under bright sunlight.

For amorphous silicon cells c type, the efficiencies obtained b NPL group compare very well wi best produced in technolog advanced countries like Japan a United States.

The development of amorphou icon based photovoltaic system taken up as a technological missi the centre under the Seventh Plan NPL process is expected to be tri in a pilot plant being set up b Bharat Heavy Electricals Li (BHEL) in the outskirts of Delhi DNES sponsorship.

The NPL group involved in th is headed by Dr. V.V. Shah. Othe members are Dr. R. Bhattach Dr. P.N. Dixit, Dr. O.S. Pa Mr. B.S. Satyanarayan, Mr. Tana and Mr. Ajay Tyagi.

-- **P.T.I. Science S**

AZT--RESISTANT AIDS VI STRAINS

AIDS patients treated with A only approved anti-AIDS drugs, to develop drug-resistant strains AIDS virus over time, researcher United States have said.

While AIDS patients were advised to ntinue taking AZT, researchers said finding suggests that AIDS, like ncer and tuberculosis, may be treated st effectively with a combination of ugs.

"Many of us who have had experice with chemotherapy expected that is was going to happen", said Dr. ouglas Richman of the University of alifornia at San Diego.

"I am convinced that AZT will be ne of the lynchpins of combination AIDS) chemotherapy for a long period f time. What we need is to get some ore drugs to add to it", said Richman.

A study conducted at UCSD by ichman and two scientists from Wellome Research Laboratories found that IDS virus cells, or isolates taken from patients treated with AZT for etween six months and three years ere more resistant to the anti-viral drug n laboratory tests.

"Some of the laboratory tests were 00-fold more resistant", said Richman.

Isolates taken from 19 other AIDS patients who either had not received AZT or had taken the drug for only a short time did not show the same resistance to the anti-viral drug.

An encouraging finding from the study, published in the journal "Science", is that "resistant isolates were still fully sensitive to other experimental AIDS drugs", Richman said.

"There were very few compounds to which cross-resistance was seen in these patients", a finding that supports the combination chemotherapy approach to AIDS treatment, he said.

Burroughs Wellcome Co., the maker of AZT or zidovudine, reported the finding in letters sent to doctors in 26 countries. Company officials said they consulted with outside experts about the impact of its findings and concluded that there is no reason for AIDS patients to halt AZT treatment.

There were no significant changes in the medical condition of patients at the time the drug-resistant viral strains were detected, Richman said.

AZT is the only drug approved by the Food and Drug Administration to directly combat the AIDS virus, and studies have shown it can prolong and improve the quality of life for many AIDS patients.

The Human Immunodeficiency Virus, or HIV, which causes Acquired Immune Deficiency Syndrome, has been particularly difficult for scientists to attack because it mutates at a rapid rate.

Leading AIDS researchers said they were not surprised that AZT-resistant forms of the AIDS virus had appeared, noting a similar phenomenon occurs in patients undergoing long-term drug therapy for other diseases.

Dr. Anthony Fauci, Director of the National Institute of Allergy and Infectious Diseases, said, "people on AZT should not be concerned, and I don't think they should feel that now, all of a sudden, an effective drug has been lost. It hasn't."

Dr. John Mc Gowan, Chief of AIDS drug development at Niaid, said there is a "possibility" that AIDS patients could transmit AZT-resistant virus to others by sexual or blood-to-blood contact. But Mc Gowan said such instances were likely to be rare and have little impact on the overall scope of the AIDS epidemic.

Meanwhile, other AIDS researchers have clarified that saliva is a very unlikely source for transmission of the AIDS virus.

In findings presented at a meeting of the American Association of Dental Research, University of California, San Francisco, researchers reported that the HIV is only rarely found in saliva.

The AZT did show, however, that saliva may be a good source for detecting the presence of HIV antibodies which are proteins that the body produces after exposure to the AIDS virus but that do not transmit the disease.

Since it was determined AIDS could be spread through exchange of body fluids, dentists and dental hygeinists have begun wearing gloves and taking other precautions when treating patients.

"There continues to be concern and confusion regarding the possibility of transmission of HIV infection by oral fluids", said Deborah Greenspan, who headed the UCSF study. "Epidemiological evidence argues against oral transmission, but isolated and unconfirmed case reports from elsewhere nevertheless claim transmission through oral sex and even biting."

The UCSF study to examine the issue of AIDS transmission by saliva involved 73 homosexual men diagnosed with a mouth lesion called hairy leukopiakia which is now recognised as a marker for later development of AIDS. Unknown before the AIDS epidemic, the lesion was first reported in 1984 by Greenspan and her colleagues at the UCSF dental school.

While all the study participants had the lesion, Greenspan said, none were diagnosed as having AIDS because none showed evidence of the major opportunistic diseases -- such a pneumocystis carinii pneumonia or Kaposi's sarcoma cancer -- associated with full-blown AIDS.

The AIDS virus was found in the saliva of only one of 23 patients whose saliva samples were tested for the presence of the deadly virus, Greenspan said. In another group of 50 patients,

testing focused on detection of HIV-antibodies in saliva and about 94 per cent of samples tested positive for the antibodies. Greenspan stressed that AIDS transmission is related only to the presence of the AIDS virus and not to the presence of HIV antibodies.

However, the researcher said testing saliva may prove very useful in third world countries where information is needed on the spread of AIDS and where testing with blood is not always possible.

-- P.T.I. Science Service

NEW COST-SAVING VIRUS DETECTION TECHNIQUE DEVELOPED

Researchers working at ICRISAT, in continuing efforts to detect plant viruses, have standardized a method for an enzyme-linked immunosorbent assay (ELISA) using material available in developing countries, such as India, which costs less than one-fifth the cost of conventional methods. This work resulted from an idea put forward in 1978 by an Indian scientist, Dr. Usha M. Joshi, working with the Insitute for Research in Reproduction, Bombay, which did not gain adequate recognition.

ICRISAT's standardized method uses penicillinase, an enzyme found in bacteria that converts penicillins into penicilloic acids. The conventional enzymes currently used in the ELISA tests are alkaline phosphatase, horseradish peroxidase, and urease, which are costly and not easily available. Some of their substrates have potential cancer producing properties, and are hazardous in their hydrolysed forms.

Penicillinase is easily available in India, while the other enzymes used in the test systems have to be imported from developed countries. ICRISAT, in research over the past 6 months, has found that certain penicillins cannot be used in ELISA. However, the penicillins that can be used are based on sodium and potassium and are easily available in India.

The method using penicillinase can thus save considerable foreign exchange for developing countries such as India. The ELISA test is essential to detect viruses even in humans. The modified technique developed by agricultural scientists at ICRISAT, if applied in the medical field, could considerably reduce cost involved in such tests.

NON-ALKALI GLASS BY THE FLOAT PROCESS

A Japanese company, Asahi Glass Co., Ltd. has developed the technology for manufacturing low alkali glass and non-alkali glass by the float process. This is the first production method by the float process in the world, reports "Techno Japan".

Non-alkali glass which contains no alkali and low-alkali glass which does not exude alkali are used for display parts of the word processor, personal computers and terminals, and liquid crystal TV sets. They are being produced by the down-draw process or the roll-out process. Production by the float process has been achieved by the development of production facilities operating at 1250 degree Celsius during the float bath process. Since the basic sheet produced has excellent flatness and little deviation of sheet thickness the grinding process in the final stages can be reduced to a large extent. The production efficiency is also high, enabling cost reduction.

Sheet thickness which can be produced are from 0.7 to 6mm and the sheet width possible is upto 2m for more than 2mm thickness, says "Techno Japan".

-- P.T.I. Science Service

BIO-PULPING TECHNOLOGY

A Japanese company, Kobe Steel Ltd., has developed the technology for manufacturing pulp for high-grade paper by decomposing wood at normal temperature and pressure with bacteria. Lignin, which is little decomposed in wood, is 80 per cent decomposed by biological treatment. Since energy for heating raw wood is not necessary, it is possible to reduce the manufacturing cost of pulp to half the current costs, reports "Techno Japan".

In the manufacturing process for pulp involving extraction of cellulose from wood, the most time-consuming process is decomposition of lignin covering the cellulose. Kobe has succeeded in decomposing 80 per cent of the lignin by adequately adjusting the reaction temperature with wood using special "rotting" bacteria. The method using conventional bacteria has been able to decompose only about 30 per cent.

In the case of chemical pulping, which is the major pulp manufacturing process at present, wood is steamed at 170 to 180 degrees Celsius for about three hours using chemicals. About 80 per cent of the lignin is decomposed by this method which costs about 10,000 yen per tonne of pulp when heavy oil is used as fuel. In the case of decomposition by bacteria, the cost is theoretically less than 5,000 yen per tonne as the energy to kill miscellaneous bacteria and to heat chemicals is not necessary.

The bacteria Kobe has discovered have not only high decomposing efficiency for lignin, but also cause very low decomposition of cellulose which becomes the pulp fibre. Therefore the yield of pulp from wood by this method is about 60%, compared to 50% by chemical pulping. So there is a saving of a sixth of wood consumption. Using these advantages, Kobe will commercialise bio-pulping using bacteria as an alternative technology to chemical pulping. Since a large-scale bioreactor is necessary and it takes nearly 2 months for decomposing wood, further technical development is necessary before the process can be commercialised.

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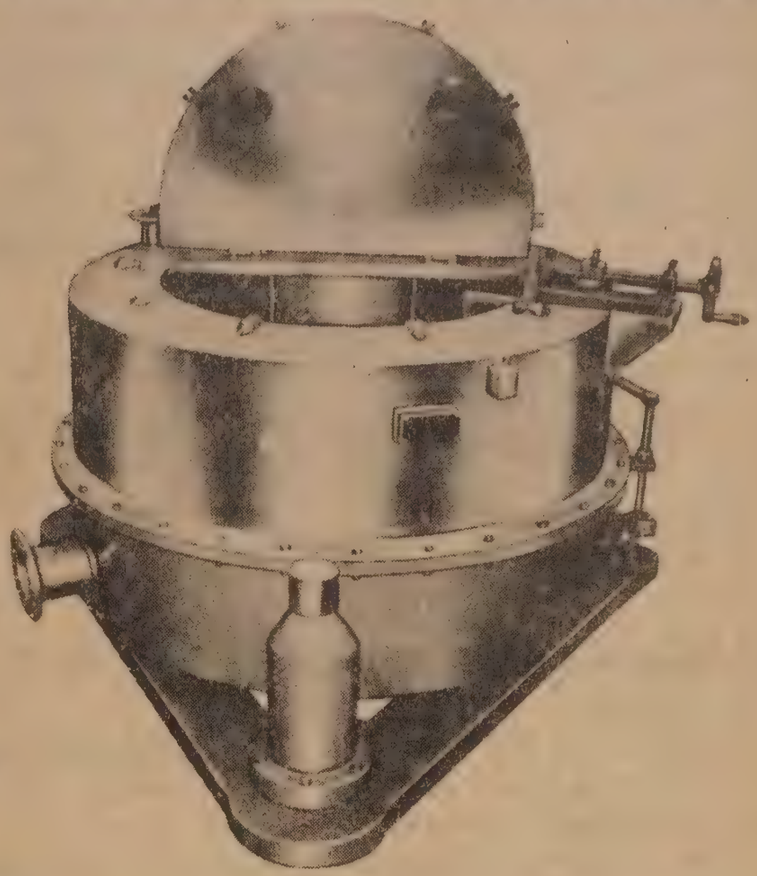

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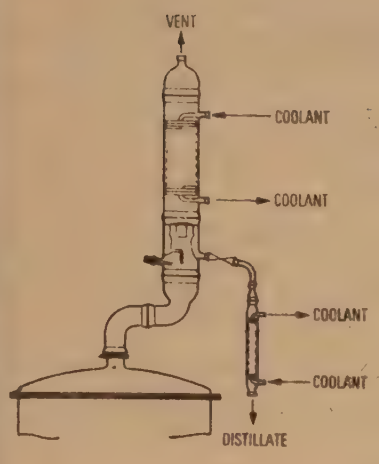

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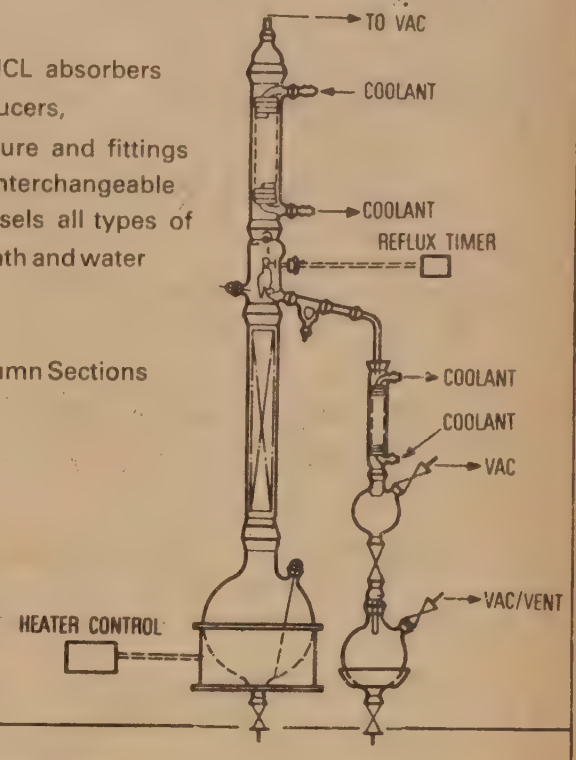

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NEWS FROM ABROAD

SHELL STUDIES PLAN FOR MOERDIJK CRACKER

Shell has revealed that it is considering a world scale "industry cracker" for its site at Moerdijk in the Netherlands for start up in the 1990s.

Speaking to ECN at the NPRA conference in San Antonia recently, Neville Pinnington, head of base petrochemicals at Shell International confirmed that the company was studying plans for a flexible 500-700,000 ton/year cracker.

Although these are still at an early stage, Shell is believed to be sounding out potential partners for the venture to share investment, feedstock and product lifting, bringing the concept of a European industry cracker closer to reality.

Shell had been rumoured to be considering new ethylene capacity for sometime, particularly in the wake of announcements of expansions of its Shop linear alpha olefins capacity at Stanlow, a low density polyethylene plant at Carrington and, more recently, its plan to join Exxon in a new lldPE unit at Notre Dame de Gravenchon in France.

Sources say Exxon would make an ideal partner for the Moerdijk venture, particularly given the two companies' collaboration at Gravenchon and the joint ethylene cracker at Mossmorran. However, others believe that more likely partners could be DSM or Finaneste. Neste will still be facing an ethylene shortfall for the 1990s despite the start up of the new unit at Antwerp next year.

The Shell move is significant, coming only weeks after Dow declared its intention of building a similarly sized cracker at Terneuzen, leaving both companies courting the same joint venture partners. However, some sources believe that Shell and Dow themselves could form a partnership at one or other of the Dutch sites.

Informed sources say that there is little to choose between the projects with both offering an economic option and benefiting from existing infrastructure and access to the ARG pipeline system. But, if both are given the go-ahead, it could cast doubt on some of the costlier planned expansions such as BP, Veba and ICI.

Although new capacity is certainly required in Europe for the 1990s, analysts point out that if all currently planned expansions are implemented, operating rates on European ethylene crackers could fall to 85 per cent as early as 1994.

ICI DIVESTS C-I-L BUSINESSES

ICI has agreed to sell the plastics businesses of its Canadian subsidiary C-I-L to a group led by the management. The assets of C-I-L Polymers and C-I-L Films and Packaging have been sold to AT Plastics Inc, a firm formed by the management, for an undisclosed sum.

This sale is the first to be announced following ICI's review of C-I-L's activities last year. After that review it was decided that C-I-L and ICI would focus resources to develop core businesses of paints, agriculture, forest products and waste management. Buyers for the Sulphur Products and Oilfield Service businesses, and Chemetics International, are expected to be announced in the near future.

At Plastics will continue to focus its efforts on speciality niches. C-I-L Polymers is involved in the production and marketing of ethylene-based resins, EVA, copolymers and speciality polymers. Products are sold to packaging manufacturers in Canada, the US and the Pacific Rim.

C-I-L Films and Packaging produces and markets films for the agricultural industrial and consumer markets. Also included in the deal is C-I-L's 50 per cent share in Alberta AG-Industries. All these businesses have sales of about $200m. Completion of the sale, believed not to exceed £120-m, is expected in the near future.

ICL PRIVATIZATION LOOMS

The Privatization of Israel Chemicals looks set to be finalized by the end of this year. First Boston Group, commissioned by the Israel government to oversee the privatization, intends to visit the offices of ICL and its affiliates over the next few weeks. The US-based group says it will soon be able to provide potential buyers with information about the companies.

Officials from First Boston met with the Israeli finance and trade and industry ministers to discuss the privatization timetable recently. First Boston's most recent assessment values ICL and its affiliates at between $500-800m.

It is believed that First Boston has already been approached by potential suitors for ICL. First Boston has let it be known that it is willing to consider offers from firms willing to pre-empt the bidding process, "our objective is to get higher than the top value range for the company."

BANDAR KHOMEINI COMPLEX FACES AXE

Mitsui is believed to be close to pulling out of the Iranian petrochemicals complex project at Bandar Khomeini. Executives at the company are believed to consider that resuming work on the war battered project is no longer economically feasible, but Sinsaku Tadano, general manager of Mitsui's Iran petrochemical project division, refused to comment on the negotiations claiming that they are at "an extremely delicate stage of development."

The two partners are at loggerheads concerning the state of damage to the complex. Japanese engineers claim most of the 13 major plants have been damaged, while Ahmed Rahgozar, chairman of Iran's state-operated National Petrochemical claims the war damage to the complex is only slight.

The Iranian government is determined to complete the 18 year old project and is believed to have already sounded out West German companies to assist with construction. A total of five Mitsui group companies were involved in the project along with 20 of Japan's commercial banks and 27 major contractors.

ENIMONT & SNIA MULL FIBRES PACT

Italy's space, defence and chemicals group Snia and Chemicals giant Enimont are planning to set up further joint operations. Negotiations are focusing on both groups' fibre operations and their chemical and engineering compounds division.

Neither company will comment on the exact form this co-operation is expected to take, but Enimont chairman, Franco Reviglio, has denied speculation that Snia will take a stake in Enimont. The favoured approach is merging and rationalizing common activities, he added. Snia's fibre operations are grouped under its subsidiary Snia Fibre. Also involved is its fine chemicals subsidiary Caffaro and the engineering polymer division Snia Tecnopolimeri.

Enimont and Snia have already set up a joint venture, Bellco.

STATOIL APPROVAL

Statoil, the Norwegian state-owned energy to petrochemicals company, has given approval for the $400m propylene/PP complex to be built in collaboration with Himont at Antwerp. Statoil's general meeting also endorsed the establishment of a 50:50 joint venture with Himont and the setting up of two 100 per cent Statoil owned joint stock companies in Belgium each with a share capital of BF1.25m ($32,000).

The Belgian petrochemical plant will produce 400,000 ton/year propylene and 180,000 ton/year PP. The PP unit will use Himont's Spheripol process and is scheduled for completion autumn 1990.

ICI SELLS, UK TRANSPORT DIVISION

ICI has sold its chemical distribution facilities at Billingham, UK, to a management buyout team. The deal includes its tanker fleet, depot and workshop area. The new venture is called Imperial Tankers and aims to specialize in the road haulage of chemicals, gases and bulk liquids.

The new company has already won a distribution contract with ICI. Its distribution manager, Alan Halfpenny said: "The contract represents the largest single private transport operation used by ICI for bulk chemicals."

TOTAL EXPANSION

Total Chemie are to extend reforming capacity at the Flessingen refinery in the Netherlands, a 55:45 per cent joint-venture with Dow. The company plans to introduce a 300,000 ton/year aromatics capability, at a cost of FF 800m ($125m).

The new capacity will produce benzene and xylenes and is expected on stream by the end of 1989.

FRENCH CHEMICALS BUOYANT

In 1988 the French chemical industry showed a buoyant FF22.4bn ($3.5bn) positive trade balance, up slightly on the 1987 figure of FF21.5bn.

Exports were up 14.2 per cent to FF130.6bn, while imports grew by 16.6 per cent over 1987 figures to total FF108.2bn.

Both worldwide and in EEC terms the most significant positive performance was realized by the perfumes and cosmetics sector followed by pharmaceuticals and then plastics.

The trade balance with the EEC was a positive FF557.2m compared with a deficit of FF269.7m in 1987, while the scales swung even higher in favour of France versus the rest of the world, from a positive balance of FF2.23bn in 1987 to FF3.69bn last year. France's chemicals trade group described 1988 as an "exceptionally good" year as volume chemicals soared 6.5 per cent to FF305bn.

Chemical Markets Abroad

DE WITT REPEATS WARNING ON DANGERS OF OVERBUILDING

As the world petrochemical industry continues to enjoy high operating rates and record margins, prompting a spate of new capacity announcements, more sharp warnings on the dangers of overbuilding were sounded by speakers at the recent De Witt petrochemical review in Houston.

Speaking on the world ethylene business, De Witt vice president Earl Armstrong warned producers against 'longterm' investment based on merchant or export sales. "Export markets will be harder to find, particularly in view of the planned monomer expansions in developing countries."

US cracker operating rates (per cent)

	1991	1992
Base case	87	85
Defer expansions	87	90
No recession	90	88
Combination	90	93

Focusing on US capacity build-up, Armstrong noted that the improvements in ethylene margins had prompted almost every US producer to announce a major expansion. Significantly, this trend is now being seen in Europe, particularly following the recent cracker announcements by Dow, Repsol and Shell.

According to the De Witt consultant, supply/demand balances for the US indicate a significant surplus forming by 1992 if all the major expansion projects are implemented. This scenario allows for the prospect of a recession in 1990 and assumes an ethylene growth rate of 3.5 per cent/year. As a result, operating margins will be pushed back from their current level of close to 100 per cent down to 85 per cent. Even if the announcements are deferred, — not too bad an assumption, Armstrong pointed out given the reported schedule backlog by engineering companies — the rate would only improve to 87 per cent.

If the operating rate does drop this far, it will have a significant impact on the merchant ethylene market. The De Witt base case would see merchant operating rates down to a "terrible" level of 60 per cent by 1992. Even in the more optimistic case, the results only improve to 85 per cent.

The main cause, as Armstrong pointed out, is 2m ton of new US capacity chasing a merchant increase that is almost negligible. The culprits are companies like Quantum back integrating into ethylene and taking themselves out of the market as merchant buyers.

Armstrong questioned the meeting on who would be the first producer to blink, a difficult question involving logic, financial strength, feedstock position, downstream integration, timing and market position. He presented delegates with a list of US projects, showing the strengths and weaknesses in this area and warned some of the poorer scoring companies to reconsider projects.

"Our opinion is that if you are a merchant marketer and also late in the relative schedule, it might be wise to either work very hard for joint ventures or long term contracts to reduce risk — or reconsider your schedule."

In the most optimistic case of deferred expansions and no recession, rates would only reach 93 per cent. "Realistically, are you going to bet your career on a no-recession scenario with an ethylene growth rate of 3.5 per cent in a market which many feel is generally mature," he asked delegates.

HOECHST RESTARTS ACETIC ACID UNIT

Hoechst-Celanese are set to restart their 250,000 ton/year acetic acid plant in Pampa, Texas. The unit has been closed since November 1987, when an explosion and fire destroyed large parts of the Pampa complex. Contractors Fluor Daniel were brought in to reconstruct the damaged plant.

Feedstock for the acetic acid plant will be provided by a recently commissioned reactor producing quantities of acetaldehyde. Hoechst-Celanese expect the acetic acid unit to be operating commercially before the end of April. It is thought that Hoechst will revive lapsed contracts and re-enter product into the merchant market.

ITALIAN ACRYLICS UNDER PRESSURE

Italian Acryclic fibre producers continue to face shrinking margins in the face of an increasingly hostile market. This became clearer as the Italian major, Montefibre registered a loss in earnings last year of 69 per cent on 1987. Net earnings fell from L72bn ($52.1m) in 1987 to L22.5bn in 1988.

Feedstock price rises are one factor behind the squeeze facing acryclic makers. Acryonitrile rose from DM1 200-1,250/ton in the first quarter of last year to now stand at DM1 700/ton.

Changing fashions and rising imports have added to fibre producers worries. Last year NWE acryclic fibre demand fell from 580,000 ton/year to 465,000 ton/year.

UNCERTAINTIES CLOUD Q2 PA CONTRACTS

Negotiations for phthalic anhydride (PA) second quarter contracts are taking place against a backgrcund of variable factors. Prices are undergoing a slight turndown, not just affecting the European market but p.oving more of a worldwide phenomena. Orthoxylene feedstock prices have begun to recede, with spot numbers falling from $605/ton fob Rotterdam in January to currently stand at $460 ton fcb PA producers, however, have yet to reap any benefit makers from this trend.

In the first quarter solid PA contracts were settled at DM1.45/kg; this was done at a time when confidence had returned to the market. Negotiations were set against a bullish background, as buyers expected a quick resurgence of Far Eastern export markets. This scenario saw imports into Europe being drawn away to the more lucrative Far Eastern market.

Confidence in the phthalic anhydride market has subsided in the short-term. Demand from the Far East, especially China, has yet to return and producers are now delaying any immediate purchases as this realization sinks in.

Most observers agree that eventually China will re-enter the market, as a major buyer, but nobody is willing to say when. One player estimated that the dip in Far Eastern demand would leave European producers with surpluses of 80.000 ton. Union Petrochemical of Taiwan has restarted a reactor lessening their merchant needs by 30.000 ton/year.

Slipping Far Eastern demand is doubly effecting producers, European phthalic anhydride export opportunities are cutback, while countries which would concentrate on marketing material to China are now targeting Europe. Parcels of solid phthalic anhydride from South America have been quoted at prices down to DM1.25/kg fob NWE. Although large quantities of product have not reached Europe, imports are having a major effect, in a vulnerable market.

Spot phthalic anhydride prices have been hard hit by import pressures. At their height, in the first quarter, solid phthalic anhydride prices stood at DM1.50/kg, but these have now slumped to DM-1.35/kg. Makers have stopped running plants flat out, while also delaying any immediate purchases, as the extent of falling buying interest becomes clear.

The worldwide market seems to be undergoing a temporary dip in PA demand and prices. US producers are known to have turned down a number of plants, to reduce stockpiles. Restarts in the US have also been delayed. Koppers had planned to recommission 22,000 ton/year of capacity at their plant in Cicero, Illinois, this has now been cancelled for the foreseeable future.

The drop in orthoxylene feedstock second quarter contract prices should provide a boost for phthalic anhydride producers. Orthoxylene has been settled at DM-925/ton for the quarter, although originally Total of France had hoped to hold out for higher numbers.

Some market observers have dismissed the drift in orthoxylene prices, they say the phthalic anhydride market is driven by supply and demand, with feedstock costs being relatively minor. Countering this argument is an awareness of last year's orthoxylene price hikes. Contract prices have risen from DM585/ton in the second quarter of 1988 to stand at DM925/ton now. PA producers have felt a squeeze on their margins, coupled with increased pressure from cheaper imports.

CANADIAN PLASTICS

Canadian Plastics will greatly benefit from the new free trade agreement with the US according to the Canadian Plastics Institute. Growth in polymers will help the Canadian chemical industry's capital spending by approximately 26 per cent in 1989 to Can$815m ($682m), it was estimated. Expenditure on petrochemicals is projected to rise to Can$599m this year.

PANOCEAN BUYS TERMINAL FACILITIES

Panocean Storage and Transport Ltd, a subsidiary of Ocean Transport and Trading plc, has bought the Hull Docks Storage Ltd, a relatively new company. The 10,-CCO cubic metres of new storage comprises 26 tanks of between 20-650 cubic metres. The terminals has been built on a greenfield site and will be used to store bulk liquid products.

The new storage terminals brings Panocean's total capacity to 1.5m cubic metres worldwide, with centres in the US and Europe. Berthing facilities allow for vessels up to 8.000 dwt to use the terminal.

It is felt that Panocean will use the new space in co-ordination with existing facilities in the UK, Rotterdam and Antwerp. Panocean specialize in the storage and distribution of chemicals, lubricating oils, and petroleum products.

Technological Scene Abroad

IKK DEVELOPS DIPN PROCESS

Japan's NKK and Chiyoda have ointly developed a new economi- al process for making high pu- ity 2,6-diisopropyl naphthalene 2,6 DIPN) from naphthalene and ropylene. The two firms believe he material could be a promising ntermediate to manufacture high erformance polyester resin, EN, via 2,6-naphthalene dicarbo- ylic acid.

According to the process de- elopers, the use of alkylation nd isomerization technologies, nconjunction with continuous ad- orption/separation processing gi- es significantly improved yields f the diisopropyl naphthalene in urities of higher than 99 per ent.

Commercial scale plant design as already been completed, and ow the two companies are esti- nating operating costs and study- ng a time schedule for commer- ialization of the process.

The conventional route to 2,6 DIPN is based on diisopropyl na- hthalene feedstocks and uses rystallizing/separation technolo- y. NKK says this process has rohibitively high operating costs.

PEN resin has several impro- ed properties over polyethylene erephthalate (PET). It is more eat stable, withstanding tem- eratures of up to 130°C, and is ougher. As a result, NKK says he material is ideal for use in ood packaging which requires terilization, and condensers for hin, small format photographic ilm.

KOCH INVESTS $30M IN CATALYTICA

US Oil and Chemicals concern Koch Industries is investing $30m in Catalytica. Koch will take a minority stake in the catalysts outfit and has agreed to fund certain R&D activities.

The companies have agreed to jointly commercialize technologies resulting from two Catalytica projects that Koch will fund. Additional investments have also been agreed depending on progress made in these projects.

While Catalytica stated that details of the two projects can not be revealed until patents have been cleared, they involve developing new chemical processes in areas of mutual interest. Koch claims a strong position in mass transfer and separations technologies.

CHEMIE LINZ PLANS LEVULINIC ACID UNIT

Continuing its move into speciality niche markets, Austria's Chemie Linz is investing in a 1,000 ton/year levulinic acid plant. The Sch 30m ($2.3m) unit will be based on new technology developed by the Austrian firm. According to Chemie Linz, the process is based on a new raw material and results in very high purity levulinic acid.

The acid is used to make metal adhesives and plastic additives such as n-butyllevulinate and diphenolic acid. It is also used as a raw material for antirheumatic drugs.

Chemie Linz values the world market for levulinc acid as Sch 100m/year, and expects strong growth in demand.

POLYSAR STARTS UP NITRILES UNIT

Canada's Polysar is commissioning the first US hydrogenated nitrile rubber unit in Orange, Texas. The $25m unit will produce 1,600 ton/year of the specialist nitrile rubber Tornac.

According to Pierre Choquette, president of Polysar's division: 'The modular design of the plant lends itself to future expansion and we are planning and prepared to double it." Nitrile rubber feedstocks for the new plant will be shipped down from Polysar's Sarnia, Ontario facility.

The product is being developed for special high temperature applications in automotive seals, gaskets, hoses and belts and in the oil field sector.

Polysar estimates that world demand is around 3,200 ton/year. It is anticipated that the market will grow to around 6,000 ton/year by 1994. Last year, Japan consumed approximately 1,300 ton of the product, while the US and Europe utilized around 200 ton each.

The leading producer, Japan's Nippon Zeon, has just started construction of a new facility in Bayport, Texas, the US. The firm has been operating a 1,800 ton/year unit in Japan since 1984. Nippon Zeon recently agreed to buy BP Chemicals' nitrile rubber facilities in Barry, the UK. It may use product from this plant to supply the US unit, or alternatively ship nitrile polymer from Japan.

In Germany, Bayer, which was the first company to develop hydrogenated nitrile rubber technology, has a pilot plant in operation. All three producers have their own patented catalyst system for manufacturing the rubber, which involves fully hydrogenating butadiene in the nitrile.

Biotechnology

BEECHAM DEAL KEY TO SMITHKLINE SALVATION

Details of the merger between UK health care and consumer products company Beecham and the US drugs giant SmithKline Beckman are expected in the next few weeks. Intense stock market speculation about the future of the troubled US company forced an early announcement of the merger talks recently.

The close fit and complementary product ranges of the two companies has prompted industry analysts both sides of the Atlantic to welcome the proposed merger. The combined pharmaceutical and OTC divisions of Beecham and SmithKline would give the new company sales of over £2bn ($3.4bn), ranking behind the US concern Merck and alongside the UK group Glaxo.

It is also seen as strengthening SmithKline's future. Declining sales of its two main products, the anti-ulcer drug Tagamet and the diuretic Dyazide, have hit profits, and the lack of new products at the R&D stage have made it particularly vulnerable.

But industry observers are still expecting third parties to launch a last minute takeover bid for SmithKline and even for Beecham. Swiss company Hoffman-La Roche is touted as a potential bidder for the UK company and Du Pont for SmithKline. Both merger partners are capitalized at around £4.5bn.

Beecham and SmithKline are remaining tightlipped about the proposed structure of the merger revealing only that it effects "major parts of their respective businesses". It is widely expected to involve prescriptives, OTC products where SmithKline's main brands are Contac cold treatments and Ecotrin aspirins, and Beecham's consumer brands.

Rationalization of R&D spending, which combines at £275m, annually, of facilities and sales teams will yield some £2bn, according to John Aldersley, analyst with London broker Citicorp Scrimgeour & Vickers. Sales of peripheral businesses could raise another £1.5bn. SmithKline is expected to put its scientific equipment arm, Beckman Instruments, and Clinical Laboratories on the market. Beecham in turn is expected to sell its cosmetics division.

These cost benefits are seen as vital to Beecham, which is thought to have more drugs in development than it can afford to bring to market. Foremost is the thrombolytics drug Eminase, due to get US approval within the next year. The merger will also give Beecham a strong sales presence in the US, where it has failed to match the success of its UK rivals Glaxo and Wellcome.

Managers for the new company will be selected from both companies but talks are now focussing on devising a role acceptable both to Beecham's chairman Bob Bauman and SmithKline boss Henry Wendt. Bauman is thought to be the forerunner since Wendt's attempts to turn around SmithKline, which involved making 1,600 US staff redundant last year, have yet to meet with success.

ASTA OPENS CENTRE

Asta Pharma, the pharmaceuticals subsidiary of West Germany's Degussa, has opened technical centre for studying fermentation processes. Located the company's Halle-Kunsebe works, the new unit will be use to test fermentation process prior to scale up.

Asta's fermentation produc are used in pharmaceuticals ar food and feedstuffs. The com pany is currently focusing o L-lysine, an amino acid used animal feeds. Other products the pipeline include L-threonin and L-trytophan.

BASF ECOLOGY LAB

BASF Plans to invest DM60 ($32m) in an ecology laborato at Ludwigshafen, West German which will be used to test the e vironmental impact of chemica and effluents. The West Germa major currently has three uni covering ecological studies: bio logical analysis; pollution tracing and wastewater treatment. Whe the facility is completed, early i in 1991, all three facets will com under one roof. BASF hopes thi will lead to improved coordinatio of its ecological impact studies.

BECHTEL CLEAN-UP JV

A US process equipment deal and a hazardous waste-manag ment specialist have teamed up offer a dismantling and clean-u service.

Universal Process Equipme will buy the plant site as part the agreement and its partner B chtel Environmental will inves gate and coordinate the clean-u requirements to meet relevant r gulations.

Environment

US CFC INDUSTRY SLAMS GOVERNMENT TAX PLAN

The Alliance for Responsible CFC Policy, which represents US producers and consumers, has slammed proposals made by the government that would effectively impose heavy taxes on the CFC industry.

The Bush administration is planning to either auction off the rights to produce CFCs or to impose a fee on the manufacture or sale of the compounds. According to budget documents this proposal would extract $3bn from CFC producers and consumers.

The Alliance claims such a tax will siphon capital from CFC producers at a time when these companies are having to make large investments to research alternatives to fully halognenated CFCs and build new substitute plants. In addition, the Alliance says the proposals will impose significant costs on thousands of small user companies, which currently have no viable substitutes.

According to the Alliance, the CFC industry has fully cooperated with the Environmental Protection Agency (EPA) and others to achieve a smooth and reasonable phase out of ozone depleting CFCs and commercialize more environmentally sound substitutes. The industry group continues saying that the new proposal threatens this co-operative effort and places a serious cloud over the transition period for CFC related industries.

However, it has been argued that CFC producers are set to reap significant windfall profits during the CFC phaseout as they will be able to charge higher and higher prices. Last year the EPA estimated that producers could make a killing of up to $7bn as tight markets develop.

Meanwhile, the EPA has come under fire from the General Accounting Office for being slow to assess the safety and environmental impact of alternatives to CFCs. The EPA is accused of not using its power to demand toxicity test results from industry. However, the Agency says it favours self regulation and backs voluntary cooperation with CFC producers.

ALLIED SEEKS PATENT

US Technology company Allied-Signal claims to have developed an environmentally acceptable fluorocarbon to replace the use of CFC-12 in the sterilization of surgical and health care equipment. Some 13,600 tons of a blend containing ethylene oxide and the ozone depleting gas CFC-12 are used annually by the US health care industry.

Allied-Signal refuses to give any details of the product or its sources pending a patent application for the new blend. It will say only that it worked closely with health care company Pennsylvania Engineering.

According to Mark Byrene, marketing manager at Genetron Allied-Signal, the blend "has potential in foam blowing agent applications in certain refrigeration applications and even conceivably in some propellant areas."

Tests on the new blend in sterilization processes have been carried out in the US by Duke University Medial Centre. Results indicate that its sterilizing capability is equal to current CFC-12 based products while is used less ethylene oxide.

UNEP ANSWERS WASTE TREATY CRITICS

More details have emerged from the United Nations Environment Programme (UNEP) on its treaty to limit and control international transport and disposal of hazardous waste. The treaty, which was agreed in Basle, Switzerland requires only 20 ratifications to enter into force and is likely to become international law by the middle of next year.

The convention will require countries exporting waste to obtain written assent from importing countries for each specific cargo and ensure those countries have facilities to treat hazardous waste in an environmentally sound way.

According to UNEP's executive director Dr. Mostafa Tolba, the Basle convention will: "Put an end to the present lawless situation where anything goes." Tolba believes the treaty will result in a sharp reduction of transboundary movements of hazardous waste and any shipments will now be above board and strictly controlled.

The ultimate goal of the convention is to make the movement of hazardous waste to costly and difficult that industry will find it more profitable to cut down on waste production and recycle and reuse the waste it produces.

The aim is to protect the environment and conserve natural resources.

News About New Projects

DOW/LITWIN AGREE SOVIET JOINT VENTURE AT SHEVCHENKO

Following an unsuccessful attempt to partner the Soviet ministry of the chemical industry in a massive engineering plastics joint venture at Nizhnevartovsk, Siberia, Dow has agreed to participate in a development of the Shevchenko petrochemical complex in Kazakhstan at a cost of under $1bn.

An agreement of intent and basic principles relating to the formation of a joint venture has been signed in Moscow between the ministry of the chemical industry, Shevchenkovskii Zavod Plastmass, and ONPO Plastpolymer on one side — and a consortium of Western firms comprised of Dow Europe and the Litwin companies, on the other.

The joint venture intends to set up a new petrochemical complex at Shevchenko, which will add a range of styrene plastics as well as ethylene derivatives to the existing facilities.

A detailed feasibility study will be performed within the coming four months to determine the overall final project definition. If the project proceeds, engineering and construction will be led by the Litwin companies — Litwin SA in Paris and Litwin Engineering & Constructors of Houston, both subsidiaries of AMCA International. Sales and marketing will be led by Dow.

In commenting on the agreement, Andrew Butler, president of Dow Europe said: "The Shevchenko project is an excellent fit for the Dow Chemical Co. It is a practical project at an existing site related to products which are of strategic importance to the company."

If the result of the feasibility study is positive, Dow and its partners will participate in the construction of a new 215,000 ton/year ethane cracker, 130,000 ton/year low density polyethylene 125,000 ton/year ethylene glycol, 35,000 ton/year of either SAN or polystyrene and 45,000 ton/year of ABS or high-impact polystyrene plants.

The new ethylene plant, to be constructed by Lummus Crest, will be fed on ethane piped through a 600km pipeline from Tenghiz. It will be laid and owned by the ministry of oil production headed by minister Vasili Dinkov.

The Tenghiz sour gas development project is currently under construction by Lurgi/Litwin. Lummus Great technology has been recommended because of its experience in working on ethane crackers.

Other technologies will be selected as part of the fesibility study but it is already apparent that the polyethylene facility, which will most likely be a low or linear low (not high) density unit, will be based on either Dow or Soviet technology. The ethylene glycol plant could go to Scientific Design, a company with a great deal of experience in working in the USSR, or to Dow. Soviet processes will also be considered for the SAN and ABS units. The study should be completed by mid-year with construction starting early in 1990 for completion in 1993.

It is not yet clear what shareholding each of the partners will have but the Soviets are understood to want a majority stake. Dow will hold a majority share of the foreign consortium. It is intended to market abroad only sufficient quantities to satisfy financial obligations. Repayment will depend on the type of loan t consortium, which does not as y have a financial advisor, will b able to raise. Shipping the pr duct to foreign markets can b handled either by rail or by barg up the Volga and Don rivers to th Black Sea or in the direction Leningrad.

The existing Shevchenko com plex is based on a Soviet-proces 100,000 ton/year ethane cracke Because of insufficient feedstoc the cracker has worked at unde capacity. Downstream units hav been supplied by Litwin. Thes comprise a 300,000 ton/year ethy benzene (UOP process), styren (CdF Chimie) plant and two poly styrene plants — 100,00 ton/year general purpose/high im pact based on Cosden technolog and 100,000 ton/year expandabl PS using CdF Chimie's process The existing complex is not pa of the joint venture.

Dow plans to take Shevchenk as a starting point in its long-term strategy to be a key player in th future development of the Sovie chemical industry. The project i much more manageable than Ni zhnevartovsk in terms of size an because of the existing infrastruc ture.

The news comes at a time o growing concern in the Sovie Union about the giant Siberia joint venture plans. A group o senior Soviet scientists has calle for the scrapping of the projects The scientists claim that the pro jects, planned at Surgurt, Tobolsk Uvat, Nizhnevartovsk and Novy Urengoi, will cost more than dou ble the projected R41bn ($65bn will force the relocation of mor than 1m workers and their fam lies to the inhospitable Tyumen r gion, will cause ecological disa ter in the area and, when c stream, force down the world pr

News from Japan

Joint Company Established For Epichlorohydrin Venture

Tokuyama Soda Co., Tohto Kasei Co. and Matsushita Electric Works Ltd., have jointly established MTT (Capital: Y600 million) on a 70/20/10 ownership basis. The new company is scheduled to complete at the end of this a Y-3,000 million epichlorohydrin plant (output:12,000 t/y) on the site of Tokuyama Soda's Tokuyama factory located in Yamaguchi Prefecture.

Prior to establishment of the joint venture company, Matsushita called on Tohto to help the company itself meet the expected change in the demand structure for plastic material. Tohto, for its own part, requested Tokuyama to produce epichlorohydrin and supply the product to Tohto so that it can build up epoxy-resin operations.

Epichlorohydrin is used mainly as raw material for epoxy resin and is produced from chlorine and propylene, both of which Tokuyama manufactures. Tokuyama fulfilled Tohto's request with the aim of scaling up its own business operations.

Demand for epoxy resin is steadily growing for use in paints, electrical appliances, civil engineering/construction and adhesives. In particular, it is being increasingly applied to glass-epoxy IC substrates and encapsulating material along with rapid growth of the electronics industry.

In Japan, there are four epichlorohydrin makers: Showa Denko, Daiso, Kashima Chemical and Sumitomo Chemical.

Showa Denko to Build L-LDPE Plant

Showa Denko K.K. has been proceeding with expansion of production capacity for L-LDPE.

The company will construct a 50, - 60,000 — t/y switchable plant, which will be able to manufacture both L-LDPE and HDPE, with operation start-up scheduled for the autumn of 1990. The plant is expected to employ the solution process.

Simultaneously the company has been proceeding with the establishment of a structure for L-LDPE and HDPE that will accommodate the needs of the petrochemical industry.

The company will accommodate companies in the petrochemical industry such as Idemitsu Petrochemical Co., Tonen Sekiyu Kagaku K.K. and Nippon Unicar Co. with HDPE and L-LDPE.

At present it is manufacturing L-LDPE at its HDPE plant. Demand for L-LDPE has been expanding and supply of HDPE has become tight.

Under the circumstances, the company is considering efficiently operating its HDPE plant by means of expansion of production capacity for L-LDPE. Of the 50,-60,-000 tons a year of L-LDPE, 20,-30,000 tons will go to other companies or be swapped.

Tonen Sekiyukagaku To Strengthen Ties With Showa Denko In Polyolefin

Tonen Sekiyukagaku (Tonen Petrochemical Co.,) will strengthen its tie-up with Showa Denko in the polyolefin field. After concluding a tie-up contract at the end of 1987, the two companies have been examining the possibility of entering into a wider co-operative relationship.

They recently agreed to strengthen their ties in the linear low-density polyethylene (L-LDPE) and high-density polyethylene (HDPE) fields. For the moment, co-operation is being centered on the supply of L-LDPE from Showa Denko's projected plant expansion. However, in the future they aim to co-operate on HDPE production, by taking advantage of the fact that they both use the same production process.

At the end of 1987 there was a rush to expand the capacities of polypropylene plants. The two companies agreed that Tonen's plant capacity would be expanded before that of Showa Denko's, and that Tonen would then supply polypropylene to Showa Denko until Showa Denko's expansion was also completed.

Tonen is now constructing a Hipol process plant with an annual capacity of 60,000 tons which will be completed in September. Transactions involving 20,000 tons per year of the completed product have been agreed on by the two companies, with the raw materials to be supplied by the purchaser (Showa Denko).

The two companies have been examining the possibility of expanding the area of co-operation from that of polypropylene to include polyolefin resins and other peripheral business. They have recently agreed that Showa Denko will supply Tonen with 5,000 tons of L-LDPE per year from its projected expansion which is to be completed by the fall of 1990.

Mitsui Petrochemical DIC Link for Basic Liquid Epoxy Resin

Mitsui Petrochemical Industries, Ltd., and Dainippon Ink & Chemicals, Incorporated (DIC) recently announced that they esta-

blished Nippon Epoxy Resin Manufacturing Co. February 1.

The two companies agreed to industrialize the production of basic liquid epoxy resin — raw material for epoxy resin last September. They will construct a huge plant having a production capacity of 22,000 tons a year with completion scheduled for the spring of next year at a cost of about Y-2,500 million. The new plant will employ a modern process combining the two companies' technologies.

After the plant goes into commercial operation, Mitsui Petrochemical will stop the operation of its 9,000 — t/y plant and Dainippon Ink, that of its 8,000-t/y plant, and they will take the output of the new joint venture in accordance with their investment ratios.

Domestic Demand for PES, PEEK Shows Robust Growth

Demand of polyether sulfone (PES) and polyether ether ketone (PEEK) — both of which are typical ultrahigh heat-resistant engineering plastics — has begun to show appreciable growth in Japan, with commercialization of precision parts of electrical/electronics equipment and high temperature-resistant engine related parts in the background.

The products were orginally developed by ICI (U.K). Sumitomo Chemical and Mitsui Toatsu Chemicals have been importing them from the British firm and endeavoring to exploit the domestic market since the early 1980s.

For the two Japanese companies, PES demand increased by as much as 40% last year. Demand increases for PEEK were 20% for Sumitomo Chemical and 60% for Mitsui Toatsu, which aggressively expanded application for the product to, for example, pipes for ultrahigh-purity water used for semiconductor manufacture.

ICI Japan — ICI's Japanese Subsidiary-also inaugurated PES/PEEK operations in Japan two years ago. It claims there is brisk demand for use in electrical/electronics fields.

Those involved expect domestic demand for PES and PEEK to reach 10,000 tons a year (roughly 500 t at present) and 5,000 tons a year (likewise, 100 t/y) a few years hence. They say the two products have come to be recognized as advanced plastics capable of replacing metallic material. The products have high-level mechanical/chemical properties and non-inflammability as well as superb thermal resistance.

Until now their domestic demand has not grown smoothly due to their expensiveness (PEEK, over Y10,000/kg; PES, approximately Y3,000/kg).

Application of Thermoplastic Elastomer Rapidly Expanding

Mitsubishi Petrochemical Co. has found new application fields, one after another, for "Rabalon" speciality-grade thermoplastic elastomers. "Rabalon T Series" elastomer (ultralow-hardness grade) is being increasingly applied to tubes, gaskets for vacuum bottles, hot-water hoses for coffee/tea vendors, water-recycling hoses for bath tubs, and pumping tubes for artificial analysis equipment, etc. It has come to be extensively used for food-related articles since it is inexpensive and has no smell; it has replaced silicone rubber which gives of a smell as a result of vulcanization.

Its Shore stands at A15-28, markedly lower than the corresponding figure of A50 for olefin elastomers.

"Rabalon L series" elastomer (heat-resistant-Grade) is also being briskly applied to packing material for FRP-based water tanks for buildings. It is produced by cross-linking elastomer which has been molded after being subjected to special treatment. Its creep resistance and thermal resistance are both high.

"Rabalon" elastomer is based on styrene -ethylene-butylene-styrene (SEBS) commercialized by Shell Chemical (U.S.) It has strong heat/oil/weather resistance, high tensile strength at the breakage point (200-800 kg/cm^2) and low level permanent strain in the case of high compression (30-45%).

Sumitomo Chemical Completes Lab for Novel Materials

Sumitomo Chemical Co. has completed construction of its Tsukuba Research Laboratory at Tsukuba Academic New Town, Ibaraki Prefecture. The lab is scheduled to start functioning this April.

It is Sumitomo Chemical's ninth research laboratory in Japan and will specialize mainly in R & D for high-performance and elaborate-function materials. This field in particular requires an interdisciplinary and interindustrial approach as well as the use of highly sophisticated technologies, the company says.

The new lab will also play a pivotal role in the company's R&D network in such a way that the technological experties it will establish can be utilized efficiently by other laboratories and departments for both basic research and commercial application.

The lab has a total floor space of about 30,000 m^2 and is built on a site of about 140,000m^2. It is provided with advanced research facilities and data processing system operated with the aid of computers.

New Developments from Japan

otein Design System Displays echanism of Drug Efficacy

NEC Corp. has developed and egun marketing an engineering ork station (EWS) capable of esigning a new protein acting as receptor in the living body and erforming all functions neces- ry to elucidate the mechanism which any given drug acts to evelop its efficacy as a drug in e body.

Incorporating the efficient pro- in engineering methods so far eveloped based on the most-ad- anced theories concerned, the WS dubbed "BIOCES(E)" will ubstantially facilitate laborious fforts for determining biological echanisms with regard to drug fficacy.

It is provided with a UNIX op- rating system and can run vari- us kinds of software and be con- ected to advanced systems, such s a computer-chemistry system. can also exchange its data with ther molecular designing-aid ystems.

BIOCES(E) is an improved ver- ion of the "BIOCES" EWS that ses a general-purpose computer eveloped together with four drug nd chemical companies under ne leadership of Professor H. meyama of Kitasato University.

Retrieving an analogous partial ructure of a target protein from ne attached protein data bank in hich cubic molecular structures f known proteins are stored, the ew equipment graphically com- oses a 3-dimensional structure of ne target protein by giving due onsideration to the stability of s hydrophobic core.

It is capable of performing such unctions for protein modeling as xtraction of hydrophobic cores, calculation of hydrophobic values, primary-structure matching, calculation of hydrophobic-core distances, retrieval of analogous partial structures, prediction of 3-dimensional structures and energy optimization.

It is also able to theoretically analyze structural, static and hydrophobic interactions between the target protein and any drug given to react with it. NEC claims the new system is ahead of other molecular design systems because it is designed to eliminate the trial-and-error processes of the operator.

With BIOCES(E), pharmacologists at Kitasato University have already succeeded in determining the 3-dimensional structure of a lymphocyte helper T. Cell. The new machine saved a great deal of time and expense compared with the case where an X-ray crystal structure analyser is used, they say.

BIOCES(E) uses the "PS390" display unit made by E&S of the U.S. for 3-dimensional graphical displaying of a target chemical.

Distribution of Dopamine Receptors Confirmed

National Institute of Radiological Sciences has elucidated the distribution of dopamine (D_2) receptors within the brain using a high-resolution positron-emission CT Scanner. The technical breakthrough helps diagnose striatonigral degeneration by means of cubic visual images.

The Institute synthesized a radioactive chemical product designed to combine with the receptors and applied the product to diagnosis of the said disease. As a result, it could identify the nucleus caudatus and putamen, both of which constitute the corpus striatum. It is impossible to discriminate the two components using conventional methods.

In addition, it found that there was a conspicuous decrease in the number of D_2 receptors in the putamina of patients suffering from the disease.

It is also succeeded in graphically displaying the corpus striatum by means of 3-dimensional visual images and has gained confidence with regard to development of a nuclear medicine-applied diagnostic methods for striatonigral degeneration.

Development of the new diagnostic method is part of a research project for SHR-1200 high-resolution positron-emission CT equipment, the project is being jointly implemented by the institute, Chiba University and Hamamatsu Photonics.

Toho Titanium to Market Artificial Tooth Roots in 1989

Toho Titanium Co. (Headquarters Tokyo : President: S. Yashima) is planning to market artificial tooth roots made of pure titanium. New production facilities were completed at the Chigasaki Plant (Kanagawa Prefecture) at the end of last year, and an application for commerical-production approval has been logged with the Ministry of Health and Welfare. Imported products tend to dominate the tooth-root market. Toho's new domestic product follows the nickel-titanium shape-memory alloy whose production it started previously. Although pure titanium is seldom used, the company considers this new field to be a cornerstone of future business. The new product is called "Ti-Root" and is made by processing pure titanium plate.

Toho Titanium's Chigasaki plant has an integrated production line with a computeraided machining center. Regulations in the Ministry of Health and Welfare's "Drugs, Cosmetics and Medical Instruments Act" apply not only to finished products, but also to the machinery used in their manufacture. Thus, specialized equipment within the specified parameters was built for the new plant.

The company will begin marketing the new roots as soon as official approval is obtained. Whether the new product will be sold directly or through some other channel is as yet undecided. Permission is expected to be granted within this year, judging from the approval rate of previous applications.

Artificial tooth roots have already been manufactured using ceramic materials such as alumina single crystal or hydroxyapatite, which is a component similar to that in natural bones. The Furukawa Electric Co., is producing a limited number of artificial tooth roots from shape-memory alloy and Sumitomo Metal Industries is similarly making small quantities from titanium alloy. The sector is expected to achieve considerable growth due to the "greying" of today's society.

Toho Titanium has been collaborating with the Tokyo Medical and Dental University in the development of artificial tooth roots made of titanium, but co-operation from the Osaka Dental College in accumulating clinical data led to the filling of the application for official approval. After commercializing this product, the company intends to embark on production of implantation materials and medical instruments.

Efficient Skin Terminal Made for Countering Muscle Trouble

Asahi Glass Co. has developed, together with Professor. Y. Handa of Tohoku University, and begun animal tests on, a skin terminal for treatment of muscle trouble.

The skin terminal is made of biomimetic composite crystalline glass so that it can assimilate with living tissue when implanted under the skin with the terminals making contact, with muscle. Through the terminal, functional electrical stimulants are given to stir the muscle in trouble due to cerebral embolism and bone marrow.

Conventionally, electrical stimulants have been sent out through many electrodes arranged on the skin surface for treatment of such muscle trouble, whereas with the new device tens of leadwires are combined into a single strand thereby giving the functional electrical stimulants — which normal muscles have to a much wider area of muscles in the body.

From now on the company intends to establish a computer-aided control system in which the normal movements of hands and legs as standard samples are input. It is also preparing to conduct clinical testing.

The skin terminal contains a great amount of phosphorus and calcium, and these are combined with the reinforced by silicon carbide whisker which is an excellent biomimetic substance.

The substance can be directly connected to a bone and has much higher strength 2-3 times that of aluminum whisker-reinforced crystalline glass and 2-4 times that of apatite ceramics. It is also easy to process.

Antibacterial Zeolite to be Produced in U.S. on Commissio

Kanebo, Ltd. and a Japane trader have established a jo venture in the U.S. for producti and marketing of Kanebo's an bacterial zeolite ("BACTEKI LER"). The new firm, Kane Zeolite U.S.A. Inc., is 70% own by Kanebo and 30% by Nichim Corp. and will assign the zeol production involved to a local m ker, aiming at production start- in the latter half of this year. will be based in Dover, Delawa

BACTEKILLER jointly develop by Kanebo and late Professor Hagiwara of Tohoku University composed of zeolite particl 2~5 microns in diameter to whi are attached metallic ions such those of silver, copper and zi etc., so that it has an antibacter property. It is insoluble in wat and oil and can withstand temp ratures of up to 550°C. It c thus be mixed with polymer pr ducts as an antibacterial agent f which conventional organic an bacterial agents are not effecti

Kanebo has been commercia zing it since four years ago for u in its polyester fiber. The age is being produced at the rate 2~3 tons a year, half of whi has been used for inhouse-co sumption for fiber and the re marketed for use in films, pain and plastic molds.

It was granted U.S. patents l October and is likely to obt EPA (Environmental Protect Agency) approval. Subject FDA (U.S. Food and Drug A ministration) approval, the co pany intends to cultivate U. markets for use in foods and m dicines. The sales target for three years hence is set at tons and Y1 billion.

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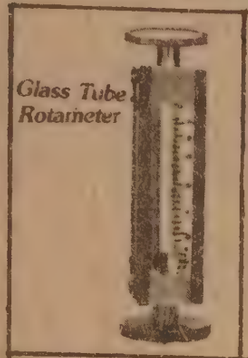

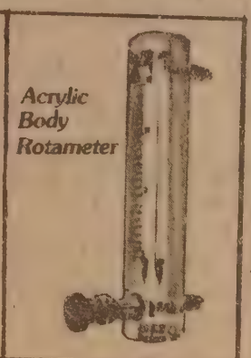

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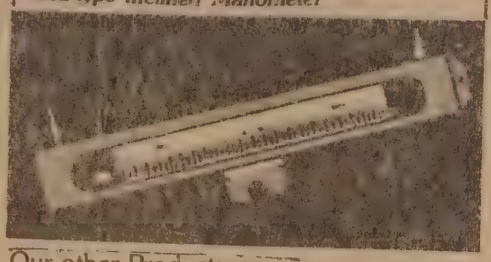

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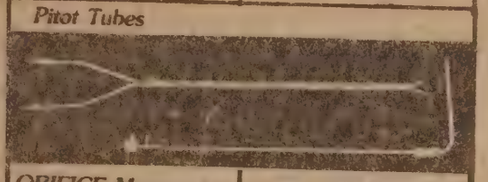
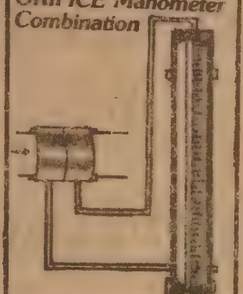


ORIFICE Manometer Combination



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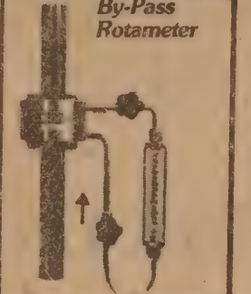

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(Anatase & Rutile)
MELAMINE
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PEROXIDE
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OF SODA
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WHITENING AGENTS
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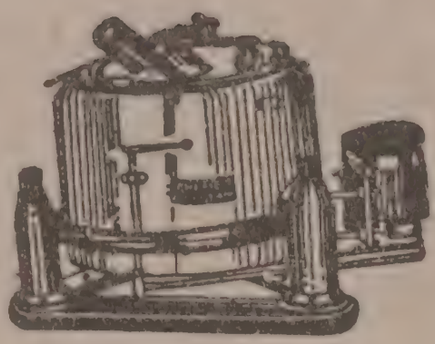
30 cm to 150 cm dia basket size in MS/SS/SS Lined/RL/RRP Lined



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Plant:
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Pincode - 402301

For your Requirements of

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CHEMICAL WEEKLY
306, Shri Hanuman Industrial Estate,
G.D. Ambekar Road, Wadala,
BOMBAY 400 031

MARKET INFORMATION

Benzene Shortage Likely

The Bharat Petroleum's benzene ant has temporarily closed down ue to some technical snag. This is kely to create a temporary shortage benzene in the Bombay's chem- al market. The chemical market itnessed few changes here and here. Boric acid moved up to Rs. 28. Bisphenol A also shot up to Rs. 73. However caustic soda declined by Re. 1 to Rs. 12. Polyethylene glycols rose to higher levels. Except cyanuric chloride which slid to Rs. 128 all other intermediates showed higher levels. The dyes section remained active.

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent –and, as such they are not FIRM PRICES as between a buyer and seller. The prices are published only with a view to giving some ideas of the market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

(Prices as on May 30, 1989)

INDUSTRIAL CHEMICALS	Per Kg.
mmonium sulphate	2.00
mmonium phosphate (Mono)	14.50
mmonium phosphate (Di)	14.00
mmonium carbonate (Di)	17.00
mmonium bicarbonate	5.60
mmonium chloride	3.00
mmonium nitrate	6.00
rsenic white powder	23.00
crylamide (Resale)	73.00
arium carbonate	6.00
leaching powder (33% Cl)	4.20
Borax (Granular)	14.60
Borax (Powder)	15.25
Boric acid (Tech)	28.00
Bisphenol-A	73.00
Butyl carbitol	105.00
Caustic soda (Flakes)	12.00
Caustic soda (Solid)	12.00
Caustic soda (Lye)	7.00
Calcium chloride 70% (Solid)	3.25
Calcium chloride 75-80%(fused)	3.50
Calcium chloride 36% (Anhydrous)	5.00
Calcium carbonate (precipitated)	4.25
Calcium carbonate (Activated)	4.75
Cobalt oxide	280.00
Cresylic acid	52.00
Camphor (Indian)	105.00
Cream of Tartar (Tech.) China	70.00
Citric acid (Belgium) (Resale)	46.00
Citric acid (Indian) (Resale)	46.00
Copper sulphate	24.00
Chromic acid	61.00
Ethylene urea	58.00
Ferric chloride (Lumps)	5.50
Ferric chloride (Anhydrous)	16.00
Glue flakes	15.00
Glue sheets	6.75
Gohsenol GH-17	122+ST
Hydro	40+ST

CHEMICALS
FERTILIZERS
SUGAR, CEMENT
PHARMACEUTICALS
DYES & INTERMEDIATES
OTHER INDUSTRIES

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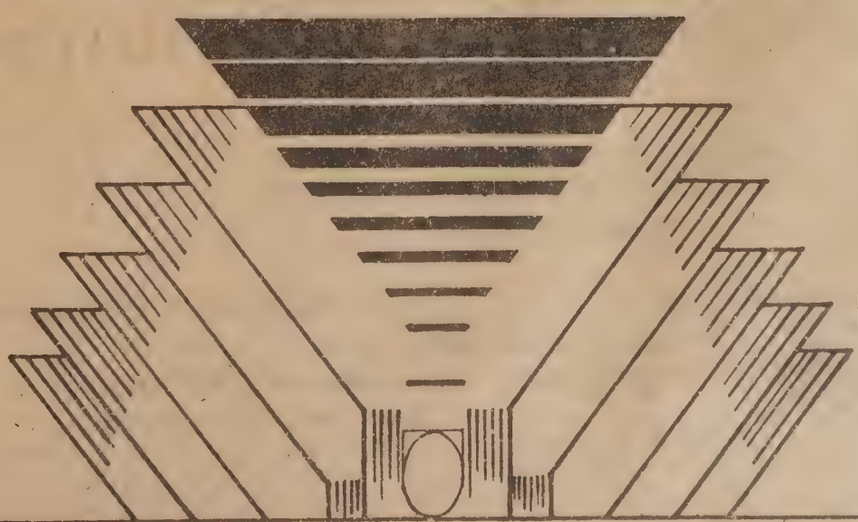

• Wide Range
Polypropylene, Cotton, Polyester, HDPE, Spun and Multifilament.
• Made to order:
Filter fabrics that are processed, fabricated and sized exactly to your machine's specifications.
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Head Office 3/623, Navjivan, Lamington Road, Bombay-400 008
Phones 897012 • 897320
Grams: KHOFIL Telex 011-76780-ID IN

Hyflosupercell	18+ST
Hexamine (Resale)	34.00
Industrial Wax	25.00
Litharge	40.00
Lead Acetate (Tech.)	31.25
Lithopone	18+ST
Magnesium chloride (Crystal)	1.25+ST
Menthol crystal (Flakes)	900+Ex+ST
Menthol bold	665+Ex+ST
Menthol crystal cold	700+Ex+ST
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	18.00
Maleic Anhydride (Resale)	37.00
Mercury (175 lbs)	13,000.00
Nickel chloride	110.00
Oxalic acid (Resale)	24.00
Peppermint oil (Rectified)	195+Ex+ST
Potassium carbonate (Indian)	24.00
Potassium carbonate (Imported)	24.00
Potassium bichromate	32.50+ST
Potassium phosphate (Mono)	14.00
Potassium phosphate (Di)	14.00
Polyvinyl alcohol (No. 117)	120+ST
Polyvinyl alcohol (No. 173)	130+ST
Polyvinyl alcohol (No. 208)	150+ST
Paraformaldehyde (Resale)	22+ST
Phthalic anhydride 36% (Resale)	28.00
Pentaerythritol (Resale)	45.00
Paraffin wax	18+ST
Rangolite (German)	80+ST
Rangolite (Czech.)	65+ST
Sodium sulphate (Fine)	6.00
Sodium sulphate (Coarse)	5.00
Sodium sulphide 50-52% (Flakes)	11+ST
Sodium sulphide 58-60% (Flakes) (TCL)	20.00
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite (Resale) per 50 kg.	680.00
Sodium chlorite 80% (Spain)	88.00
Soda Ash (Tata)	5.00
Soda Ash (Birla)	4.50
Soda Ash (Imp.)	4.50
Sodium bicarbonate	7.50
Sodium bisulphite	4.50
Sodium silicate	3.00
Sodium acetate	5.00
Sodium alginate	260+ST
Titanium Dioxide (Anatase)	110.00
Titanium Dioxide (Rutile – RCR_2)	120.00
Tartaric acid	102.00
Trisodium phosphate	5.50
Thiourea	80+ST
Urea (Tech.)	2.90
Vacuum salt	1.00
Zinc Dust	32.00
Zinc Oxide	50.00
Zinc chloride powder (Tech.)	12.50
Zinc sulphate	7.00

SOLVENTS	Per Kg.
Acetic Acid Glacial (Resale)	15.00
Acetic Anhydride (Resale)	31.50
Acetone (Resale)	16.50
Adipic Acid	57.00
Aceto Acetanilide	55.00
Aniline Oil	65.00
Benzoate Plasticiser	62.00
Butyl acrylate	78+ST
Butyl stearate	35.00
Butanol	35+
Benzyl Alcohol	60
Benzyl Chloride	34
Benzo trichloride	16
Benzoyl chloride	22
Bromine Liquid	75
Chloroform	30
Carbon Tetrachloride	20
Cellosolve	56+
Cyclohexanone	58+
Cyclohexanol	56
Diacetone (Resale)	34
Diethyl Oxalate	34
Diethyl glycol (DEG)	45+
Dioctyl Phthalate	43
Diallyl Phthalate	56
Dimethyl Phthalate	28
Dioctyl Adipate	52
Dibutyl Adipate	42
Dipentene	15
Dimethylamine 40%	12
Dimethylamine 50%	14
Ethyl Acetate	20
Ethyl Acrylate	65
Ethylene Dichloride	16
Ethylene Glycol	46+
Formic Acid (Imp.)	28.00+
Formaldehyde (Resale)	7.
Glycerine (CP)	55.
Glycerine (IW)	50.
Hydrogen Peroxide 50% (Resale)	27.
Isopropyl Alcohol	28.
Isobutyl Alcohol (Resale)	30.
Monoethanolamine (Resale)	65.
Melamine	60+
Methyl Ethyl Ketone	48.
Methyl Isobutyl Ketone	42.
Methyl Acrylate	42.
Methyl Dichloride (Resale)	26.

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Phone Nos.:6407778/6424736 **Gram: MULTIORG, Bombay-51**
Telex: 011-74530 MOL IN
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DL METHIONINE
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FRUSEMIDE IP
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IMIPRAMINE HCL
I N H IP
LYSINE HYDROCHLORIDE BP
MEBENDAZOLE IP
METRONIDAZOLE IP
NIACINAMIDE IP
NIACIN IP
PROPYLENE GLYCOL
PARACETAMOL IP
SULPHAMETHOXAZOLE IP
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TINIDAZOLE

Bombay Office:
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M/s. MEDICINE CHAMBER
Central Bldg. No.3, New Silk Bazar,
Next to Kalbadevi P.O.,
BOMBAY-400 002.
Phones: Off: 2864002/316650

Delhi Office
Mr. SURINDER PASRICHA
M/s. MEDICINE CHAMBER
1726/C, Bhagirath Palace,
Chandni Chowk,
DELHI-110 006.
Phones: Off: 235839/234131

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M.M. INDUSTRIES

432, Arun Chambers,
Tardeo Main Road,
Bombay-400 034.

Phones: 4938395
4949655
4949656

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Carbitol	68+ST
Meta Cresol	45.00
Nitrobenzene	30.50
Nitric Acid (Conc.) (RCF)	2.50
Ortho Cresol	30+ST
Phenol (Resale)	39.00
Propylene Glycol	52 ST
Polyethylene Glycol (No.200)	52.00
Polyethylene Glycol (No.400)	54.00
Polyethylene Glycol (No.500)	42.00
Polyethylene Glycol (No.1600)	14.00
Polyethylene Glycol (No.4000)	70.00
Polyethylene Glycol (No.6000)	85.00
Para Cresol	110.00
Styrene Monomer	41.00
Sorbitol	15.00
Sulphuric Acid	2.80
Trichloroethylene	29.50
Triethanolamine (Resale)	65.00
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	20.00
Vinyl Acetate Monomer	47.50

SOLVENTS	Per Litre
Benzene	11.00
N-Heptane	10.50
N-Hexane	12.00
Methanol	9.00
Solvent Naphtha Heavy	10.50
Solvent Naphtha Light	8.50
Toluene	19.50
Xylene	18.00

DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)	
Alphanaphthylamine	62.00
Alpha Naphthol (Imp.)	185.00
Aceto Aceto Ester (Methyl)	65.00
Ammonium Molybdate	210.00
Anthraquinone	125.00
Anthranilic Acid	80.00
2-Amino 4 Nitrophenol	135.00
Blue B. Base (Local)	270.00
Beta Naphthol (Atul)	77.00
Benzidine Dihydrochloride (BDH)	98.00
Bromamine Acid	500.00
BON Acid	135+Ex+Ta
Chicago Acid IRS	330.00
Coach Acid	55.00
C. Acid (Imp.)	190.00
Cyanuric Chloride	128.00
2,4- DNCB	30.00
Dihydrothio PTOS (Imp.)	1,000.00
Dimethyl Aniline	72.00
Diethyl Aniline	170.00
Diamino stilbene disulphonic acid	163.00
3,3-DCB (Imp.)	165.00
Gamma Acid (Atul)	195.00
H. Acid (Atul)	150.00
G. Salt	78.00
Isophthalic Acid	45.00
J. Acid	300.00
J. Acid Urea	370.00
K. Acid	123.00
MPDS (German)	185.00
MNA	120.00
Meta Ureido Aniline	210.00
MPD (Local)	210.00
MPD (Japan)	240.00
Naphthenic Acid	40.00
N Methyl J. Acid	485.00
N Methyl Aniline	120.00
Naphthalene (Refined)	24.00
Ortho Anisidine (OA) (Imp.)	118.00
Ortho Dichloro Benzene (ODCB)	15.00
OT Base	117.00
Para Dichloro Benzene (PDCB)	28.00
Para Anisidine (PA local)	140.00
PNA	95.00
Para Cresidine (Imp.)	360.00
Para Amino Azo Benzene (India)	185.00
PNCB	44.00
Para Amino Acetanilide	160.00
1-Phenyl 3-Methyl 5 Pyrazolone	140.00
Phenyl J. Acid	370.00
Para Amino Benzoic Acid	170.00
PT Base	160.00
Rhoduline Acid	525.00
Resist Salt 80%	32.00
Resorcinol	190.00
Sodium Naphthionate	67.00
5-Sulpho-Anthranilic Acid	80.00
Sulphanilic Acid	50.00
Sulpho Tobias Acid	145.00
Trichloro Benzene (TCB)	22.00
Tobias Acid	153.00
Metanilic Acid	54.00
MTD	120.00

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When it comes to chemicals, we care a little extra. Making sure to produce chemicals that meet exacting standards of quality, purity and reliability. Backed by research and thorough testing. Our customer service can help you improve your present products and develop new ones. And remember, we can meet your requirement in bulk... whenever and wherever you want. why not try ?

We manufacture: N.T.A. • E.D.T.A. & its salt • S.M.C.A. • Sodium Acetate & Hydrochloric Acid.

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VICTORIA BLUE B BASE/BO	PARA AMINO AZO BENZENE 3:4 DI.S.A.

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Bombay 400 058.
Phone: 6261728

Bombay Dyes Market

(Prices as on May 30, 1989)

ACID COLOURS	Per Kg.
Acid Violet 4BS	*190.00
Acid Maroon V	110.00
Acid Orange II	112.55
Acid Orange IIY	93.85
Acid Red A	137.00
Acid Scarlet 3R	128.35
Acid Red 3BN	*195.00
Acid Red R2R	132.00
Acid Red RS	68.00
Acid Patent Blue AS	*280.00
Acid Green V	*375.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	157.15
Acid Black BX	126.95
Acid Black Wax	135.50
Crosein Scarlet MOO	200.30
Procinil Yellow GS (ICI, UK)	265.00
Procinil Red GS (ICI, UK)	530.00
Procinil Blue RS (ICI, UK)	315.00
Procinil Scarlet G (ICI, UK)	600.00
Procinil Orange G (ICI, UK)	250.00
Procinil Rubine (ICI, UK)	550.00

* To get resale price add 6% tax.

DIRECT COLOURS	Per Kg.
Yellow 3GX	114.00
Gun Yellow RCH	175.85
Fast Yellow GCH	171.50
Yellow CFG Hly. Conc.	721.00
Fast Yellow GS	126.96
Fast Yellow CHRS	116.85
Viscose Orange A	210.35
Fast Orange GR	171.50
Red	122.65
Dark Tan	98.15
Red IIR	98.15
Red 4B	217.55
Bordeaux BW	170.10
Fast Scarlet 4BS	223.50
Red 12B	220.45
Bordeaux Hly. Conc.	249.20
Cotton Red N	117.05
Brill. Fast Helio B	362.85
Brill. Fast Helio 2R	385.85
Brill. Fast Helio 2RS	177.30
Brill. Fast Helio BS	116.10
Brill. Violet Extra	181.45
Blue 2B	102.50
Blue G	220.45
Sky Blue FB	242.00
Copper Blue GR	190.25
Fast Greenish Blue GL	114.60
Developed Black BT	149.95
Blue NB-2B	348.45
Blue NB-2BG	214.70
Developed Black NB-GHB	214.70
Green B	142.75
Green NB-B	218.90
Green 2B-N	218.90
Brown MR	197.40
Brown CN	137.00
Golden Brown G	175.85
Catechin G	155.70
Omega Tan	161.45
Catechin GS	102.80
Black E Hly. Conc.	180.15
Black E Extra Hly. Conc.	180.15
Black NB-ER Hly. Conc.	290.50

DISPERSOL COLOURS	Per Kg.
Red B 3B Conc	611.50
Red B 2B Conc	797.90
Red CB Powder	1048.25
Red D2B Powder	589.85
Violet C 4R Conc.	1202.70
Blue BG Conc	580.65
Blue BN Powder	128.20
Blue D 2R Powder	588.25
Navy BT Conc	531.95
Blue B 2G Conc	577.95
Black BT Conc	319.50
Blue BR	482.40
Yellow 7GL	813.20
Yellow 5RX	269.90
Yellow 3G	473.20
Yellow	140.00
Yellow AL	167.20
Yellow Brown REL	311.70
Yellow FFL	571.40
Gold Yellow GG	320.80
Pink REL	593.00
Red BEL	615.60
Red 2B	422.
Red FB	425.
Red Violet FBL	622.
Orange 3R	254.
Violet 3R	370.
Violet RL	355.
Violet 6R	638.
Scarlet RR	283.
Rubine 3B	289.
Rubine CB	449.
Blue GL	419.
Blue BGF	805.
Navy Blue RE	359
Brown 3REL	272.
Black GEL	420.
Dark Brown 3B	411.

BASE COLOURS	Per K
Fast Yellow GC	77.
Fast Orange GC	128.
Fast Scarlet R	198.
Fast Scarlet RC	128.
Fast Scarlet RCR	105.
Fast Scarlet G	115.
Fast Scarlet GN	92.
Fast Scarlet GG	77.
Fast Scarlet GGS	73.
Fast Red B	233.
Fast Red RC	115.
Fast Red R Flakes	158.
Fast Red TR	181.
Fast Red TR Oil	223.
Fast Red RL	251.
Fast Red KB Oil	251.
Fast Bordeaux GP	236
Fast Garnet GBC	103.
Fast Violet B	548.
Fast Blue BB	566

NAPHTHOL COLOURS	Per K
ASG	301
AS	205
ASSW	379
ASBS	253
ASBO	268
ASD	20
ASOL	24

STR	369.00
SPH	336.05
SE	236.00
SEL	249.95
SLB	2002.35
SBT	2459.45
SWG	143.00
SSG	538.65
SSR	652.60

PROCION COLOURS	Per Kg.
Golden Yellow HR	207.95
Brill. Yellow H4G	145.65
Supra Yellow H-8GP	168.55
Brill. Yellow HE6G	214.75
Yellow G-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	275.45
Yellow MGR	387.65
Brill. Yellow M4G	201.15
Brill. Yellow M8G	366.10
Yellow M3R	244.70
Brill. Orange H2R	303.80
Brill. Red H7B	157.95
Brill. Orange M2R	313.15
Brill. Red H8B	213.55
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.80
Brill. Red H-F3B	243.45
Brill. Magenta HB	182.00
Brill. Red M 5B	160.05
Brill. Red M 8B	218.35
Brill. Pink MB	137.10
Brill. Magenta MB	163.65
Brill. Purple H-3R	219.55
Brill. Purple H-7R	175.40
Navy Blue H 3R	333.75
Brill. Blue H-GR	406.40
Brill. Blue H5G	207.95
Blue H 5RX	286.20
Brill. Blue H 7G	213.95
Brill. Blue H 7RX	358.15
Turquoise HA	265.05
Supra Blue H-3RP	595.30
Supra Turquoise H 2G P	181.50
Blue H-FRD	305.80
Navy Blue H3R	333.75
Blue H 5RX	286.20
Navy Blue M3R	355.70
Brill. Blue MR	405.60
Brill. Blue M RX	214.20
Brill. Blue M-G	226.45
Blue M 4GD	369.40
Navy Blue M RB	341.85
Turquoise M-G	240.30
Brill. Blue M GX	516.25
Blue 3R Acra Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide	285.00
Green H4BD	287.00
Green H-E4BI	169.80
Red Brown H IF	143.25
Orange Brown H 28	209.05
Brown M GRN	188.80
Black H-N	314.20

SULPHUR COLOURS	Per Kg.
Navy Blue	210.35
Green G	194.55
Black Grains Extra	72.25
Black Grains OG	73.70
Black GXE Conc.	70.85
Black GXE	57.90
Black GXR	69.40
Black Grains 800	62.80
Black EXR Grains	73.70
Black EXR Grains 800	59.35

VAT COLOURS (ICI)	Per Kg.
Yellow 5G Supra Disperse	561.85
Yellow 5G Acra Conc	818.60
Gold Orange 3G Pdr. Fine	1158.45
Brill. Orange 6R Pdr. Fine	624.35
Gold Orange 3G Supra Disp	693.85
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	1214.15
Brill. Red 3B Supra Disp	867.45
Brill. Purple 3R Acra Powder	827.05
Brill. Purple 2R Hly Conc.	744.25
Brill. Purple 4R Supra Disp.	604.25
Brill. Purple 2R Acra Conc.	779.85
Blue 2R Powder Fine	675.30
Blue BC Acra Con Pdr. Fine	1013.15
Blue BC Conc. Pdr. Fine	713.65
Blue R Conc. Pdr. Fine	719.70
Blue Conc. Powder	645.80
Brill. Blue 2R Hly. Conc.	378.55
Blue RR Supra Powder	629.35
Brill. Blue 2R Supra Disp.	115.65
Dark Blue 2R Powder Fine	512.65
Blue BC Supra Disp.	419.65
Jade Green XBN Powder Fine	555.80
Jade Green XBN Acra Conc. Pdr	1026.05
Jade Green 2G Pdr. Fine	533.25
Jade Green 2G Ptg. Paste	125.40
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Supra Disp.	618.00
Olive D Pdr. Fine	563.90
Olive Green B Supra Disp.	421.70
Jade Green XBN Supra Disp. (N)	327.30
Olive OMW Powder Fine	698.55
Olive OMW Supra Disp.	538.05
Olive D Supra Disp.	361.70
Olive R Supra Disp.	470.25
Olive D. Ptg. Paste	193.00
Olive Green B Ptg. Paste	199.10
Olive Green B Acra Conc.	741.10
Olive R Acra Conc.	779.85
Brown R Pdr. Fine	869.45
Dark Brown 3R Fine	826.25
Brown G Supra Disp.	582.05
Brown 2G Supra Disp.	716.10
Brown R Supra Disp.	547.35
Brown BR Powder	867.75
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	529.60
Brown G Acra Conc.	967.95
Brown M. Powder Fine	768.80
Grey M. Supra Disp.	585.45
Blue BC Acra Conc. Pdr. Fine	762.70
Direct Black AC Supra Disp.	415.75
Direct Black AC Pdr. Fine	574.70
Direct Black CH Supra Disp.	490.45
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI: MAY 26, (NNS) Mixed pattern was seen in the Delhi chemicals market during last week reports NNS. Some of the chemicals lost ground owing to easy supply while some chemicals gained in values. The volume of the transaction was good over the week.

Boric acid technical recorded a rise of Rs. 100 at Rs. 1,400 per 50 Kg on account of negligible stock position as well as fall in fresh supply. During the last three weeks a rise of Rs. 225 was recorded in this chemical. Seasonal offtake was also good and stocking tendency was increasing day by day. Borax granular and crystal advanced by Rs. 10/15 at Rs. 690 and Rs. 700 per 50 Kg on poor supply.

On account of heavy demand shown by seasonal cold drink manufacturers, citric acid moved up by Rs. 25/50 at Rs. 2,350/2,550 per 50 Kg. Due to fall in imports from France tartaric acid ruled static at Rs. 7,550 per 50 Kg. Rangolite Germany jumped up again by Rs. 2 to Rs. 75 per Kg in the absence of comfortable stock position. Prices of sodium hydro sulphite Damosha, Gulshan, Tamilnadu and Kalali ruled easy at their last week's levels.

Due to shortage of supply along with renewed demand from W. Bengal, Ammonia Bi-carb traded higher by Rs. 10 at Rs. 155 per 25 Kg. Caustic soda flake resumed higher by Rs. 5 at Rs. 535/540 per 50 Kg owing to good offtake. Titanium dioxide prices sold higher at Rs. 108 owing to heavy mutual speculation among manufacturers and distributors. Menthol flake, medium and bold dropped by Rs. 25/30 at Rs. 205, Rs. 250, and Rs. 260 per Kg respectively. Due to commencement of new crop Mentha from Sambhal, Moradabad, Rampur, Amroha, and Chandausi, Menthol flake May delivery came down from Rs. 232 to Rs. 205 per Kg. Mentha oil offered lower at Rs. 160 against Rs. 185 and D.M.O. slipped by Rs. 10 at Rs. 70 per Kg in hope of bumper crop prospects of mentha this year in the country. Export demand was also poor and stockists were anxious sellers.

Mercury on the other hand fell sharply by Rs. 100 at Rs. 12,400 per flask owing to easy supply in the market by actual users/quota holders. Paraffin wax declined by Rs. 20 at Rs. 750 owing to improved supply. Prices of tri sodium phosphate suffered losses by Rs. 20/40 at Rs. 480/485 per 50 Kg. Hydrogen peroxide lacked support and was cheaper by 25 paise at Rs. 27.25/27.50 per Kg. Dyes and chemical prices did not show any change.

(DELHI MARKET RATES AS ON MAY 26, 1989)

Ammonia Bicarb (Per 25 Kg.)	155.00
Mercury (Per flask)	12,400.00
Soda ash (Per bag)	340/345.00
Ammonium Chloride (50 Kg.)	110/180.00
Caustic soda flakes (50 Kg.)	535/540.00
Citric acid (Per 50 Kg.)	2,350/2,550.00
Stable Bleaching Powder Shriram (Per 25 Kg.)	100.00
Stable Bleaching Powder KCI (Per 25 Kg.)	95.00
Stable Bleaching Powder Maruti (Per 25 Kg.)	90.00
Stable Bleaching Powder Modi (Per 25 Kg.)	98.00
Sodium Bicarbonate (50 Kg.)	285/300.00
Sodium Hydrosulphite (Per Kg.)	35.00/40.00
Rangolite (Per Kg.)	67.00/75.00
Boric acid Technical (Per 50 Kg.)	1,400.00
Paraffin Wax (Per 50 Kg.)	750.00
Tartaric Acid (Per 50 Kg.)	7,550.00
Borax Granular (Per 50 Kg.)	690.00
Borax Crystal (Per 50 Kg.)	700.00
Sodium Nitrite (Per 50 Kg.)	660/760.00
Sodium Nitrate (Per 50 Kg.)	415.00
Camphor Thal (Per Kg.)	104
Camphor Powder (Per Kg.)	94
Menthol Bold (Per Kg.)	260
Menthol Medium (Per Kg.)	250
Menthol Flake (Per Kg.)	205
Glycerine (Per Kg.)	52/55
Sodium Silicate (Per quintal)	250/300
Hexamine (Per Kg.)	36
Acetic Acid Glacial (Per Kg.)	16
Copper Sulphate (Per quintal)	2,250/2,6
Formic Acid (Per Kg.)	25/27
Formaldehyde (Per Kg.)	8
Hydrogen Peroxide (Per Kg.)	27.25/27
Calcium Carbonate (Per Tonne)	2,500/4,0
Acid Slurry Soft (Per Kg.)	25
Acid Slurry Hard (Per Kg.)	32
Phosphoric Acid (Per 50 Kg.)	1,050
Potassium Nitrate (Per quintal)	900/1,200
Potassium Permanganate (Per 50 Kg.)	4,900
Sodium Bichromate (Per 50 Kg.)	1,575/1,600
Trisodium Phosphate (50 Kg.)	480/485
Titanium Dioxide Anatase (Per Kg.)	108
Titanium Dioxide RC-822 (Per Kg.)	108
Zinc Oxide (Per metric tonne)	42,000/52,000
Phenol Carbolic Acid (Per Kg.)	37
Carbon Tetrachloride (Per Kg.)	24
Chloroform (Per Kg.)	28
Sodium Sulphate (Per metric tonne)	3,300
Naphthalene Balls (Per 50 Kg.)	1,450

DYES & COLOURS	(Per K
Naphthol AS	162
Naphthol ASG	252
Naphthol ASBS	250
Naphthol ASTR	325
Naphthol ASOL	208
Naphthol ASBO	225

DIRECT DYES	(Per K
Black E. Conc.	110/160
Diazo Black B.T.	105/135
Green B	100/127
Blue 2-B	60/92
Sky Blue FB	213
Basic Auramine	55/110
Basic Rhodamine	250/400
Basic Methylene Blue	92/130
Basic Violet	145/170
Basic Malachite Green	150/165
Acid Orange	45/80

Madras Market

Caustic soda flakes, after an ini-
al upswing, has come down to
s. 12,000 per MT. It is rumoured
iat the price drop was due to man-
facturers relicensing substantial
uantities to exporters in the coun-
y as deemed exports. In the pro-
ess the caustic manufacturers have
lso been able to realise higher rates
s the international prices for the
naterial are high at 650 to 700 US
. Sulphuric acid prices continue to
ule high at Rs. 2,600 to Rs. 2,700
er MT. Supplies of M.I.B.K. have been poor due reported shutdown of the plant at NOCIL. Incidentally, the shutdown was for increasing the capacities and when the expanded capacities go on stream the availability of M.I.B.K. is likely to be better. Cetex Petrochemicals Ltd. who are putting up facilities for production of M.E.K. at Manali, Madras have been successful in bringing material from their collaborators under market seeding programme and the material is expected to reach the market by the end of June 1989.

(MADRAS MARKET RATES AS ON MAY 27, 1989)

cetic Acid Glacial (per kg)	18.00
uminium Sulphate Iron free (per MT)	4,500.00
mmonium Bicarbonate (per 25 kgs)	125.00
mmonium Chloride (per MT)	3,000.00
id Slurry (per kg)	28.00
rium Carbonate (per kg)	6.00
rium Chloride (per kg)	5.50
ric Acid Technical (per kg)	24.00
eaching Powder (per 50 kgs)	220.00
rax (per 50 kgs)	675.00
ustic Soda Flakes – Mettur Chemicals (per MT)	12,000.00
ustic Soda Flakes – Andhra Sugars (per MT)	12,000.00
lcium Chloride 70% Solid (per MT)	3,000.00
lcium Chloride Anhydrous (per MT)	5,750.00
lcium Carbonate (Activated) (per MT)	5,750.00
Calcium Carbonate (Precipitated) (per MT)	5,000.00
Citric Acid (per kg)	49.00
Copper Sulphate (per kg)	24.00
Cresylic Acid 98-99% (per kg)	108.00+ED
Pure Para Cresol 96% (per kg)	77.00+ED
Meta Para Cresol 42% (per kg)	45.00+ED
Formic Acid (per kg)	28.00
Formaldehyde (per kg)	8.00
Glue Flakes (per kg)	15.00
Glycerine (per kg)	49.00
Hydrosulphite of Soda (TCPL) (per kg)	39.00
Hydrosulphite of Soda (IDI) (per kg)	42.00
Hydrosulphite of Soda (BASF) (per kg)	42.00
Hexamine (per kg)	30 00
Hyflo Supercell (per kg)	23.00
Hydrogen Peroxide (per kg)	29.00
Litharge (per kg)	40.00
Lead Acetate (per kg)	42.00
Magnesium Carbonate (per kg)	19.00
Magnesium Chloride (per kg)	3.00
Maleic Anhydride (per kg)	42.00
Menthol Crystals (per kg)	275.00
Oxalic Acid (per kg)	24.00
Paraffin Wax (per kg)	15.00
Potassium Bichromate (per kg)	36.00
Phosphoric Acid (per kg)	22.00
Polyvinyl Alcohol powder (per kg)	135.00
Pentaerythritol (per kg)	52.00
Phthalic Anhydride (per kg)	30.00
Soda Ash (TAC) (per 75 kgs)	375.00
Soda Ash (TATA) (per 75 kgs)	375.00
Sodium Bicarbonate (TATA) (per 50 kgs)	380.00
Sodium Silicate (per MT)	3,500.00
Sodium Bichromate (per kg)	28.00
Sodium Nitrate (per kg)	8.00
Sodium Nitrite (per kg)	15.00
Sodium Sulphide Flakes (per kg)	12.50
Sodium Bisulphite (per kg)	4.50
Sodium Alginate (per kg)	210.00
Sodium Acetate (per kg)	7.00
Sodium Sulphate (Anhydrous) (per kg)	3.00
Titanium Dioxide (Anatase) (per kg)	72.00
Titanium Dioxide (Rutile) (per kg)	92.00
Trisodium Phosphate (per kg)	7.50
Urea (Technical) (per kg)	3.00
Zinc Oxide (per kg)	50.00
Zinc Chloride Powder (per kg)	12.50
Zinc Sulphate (per kg)	6.00

SOLVENTS

Acetone -- HOCL (per kg)	18.75
Butanol (per kg)	35.00
Butyl Acetate (per kg)	42.00
Benzene (per lit)	13.00
Cellosolve (per kg)	50.00
Carbon Tetra Chloride (per kg)	22.00
Chloroform (per kg)	26.00
Diacetone Alcohol (per kg)	29.50
Diethylene Glycol (per kg)	45.00
Dichloroethane (per kg)	17.00
Di-octyl Phthalate (per kg)	49.00
Di-N-butyl Phthalate (per kg)	49.00
Ethyl Acetate (per kg)	20.00
Isopropyl Alcohol (per kg)	28.00
Methanol (per kg)	10.00
Methylene Chloride (per kg)	20.00
Methyl Ethyl Ketone (per kg)	44.00
Methyl Isobutyl Ketone (per kg)	39.00
Phenol (per kg)	34.00
Sorbitol (per kg)	15.00
Triethanolamine (per kg)	58.00
Trichloroethylene (per kg)	25.00
1-1-1 Trichloroethane (per kg)	28.00
Turpentine (per lit)	16.50
Toluene (per lit)	16.00
Xylene (per lit)	16.00

International Bulk Chemical Prices

Spot prices are as on May 17, 1989

With the oil markets now looking more settled, naphtha prices have steadied at $ 172-175/ton cif NWE. Renewed buying interest in ethylene is supporting spot numbers at $ 875-900/ton cif NWE, but availability is scarce. Butadiene supply is reportedly tightening on the back of extraction problems but with very little spot demand, numbers remain unchanged at $ 285-295/ton fob. Benzene prices have drifted to $ 445-455/ton fob with a few buyers currently in the market. Supplies are still plentiful, although a slowdown in HDA production could alter th Paraxylene continued to move dow wards, prices stand at $ 675-695/t NWE. Toluene prices have slipped ba to $ 365-370/ton fob. Xylenes remain unchanged at $ 455-460/ton for solv with virgin quoted at $ 460-465/to

Product	European Spot price range $/ton	US price range $/ton
Ethylene	875- 900 (cif)	727- 747
Propylene (100% basis)	605- 615 (cif)	462- 528
Butadiene	285- 295 (fob)	396- 418 (spot)
Benzene	445- 455 (fob)	453- 456 (spot)
Toluene	365- 370 (fob)	355- 358 (spot)
Xylenes (virgin)	460- 465 (fob)	465- 471 (spot)
(solvent)	455- 460 (fob)	n.a.
Styrene	840- 860 (T2) (fob)	859-780 (spot)
	770- 780 (T1) (cif)	
Paraxylene	675- 695 (fob)	n.a.
Orthoxylene	450- 455 (fob)	n.a.
Ammonia	168- 170 (c&f)	142- 150 (fob)
Methanol	159- 162 (T2) (fob)	158- 160 (fob)
	139- 142 (T1) (cif)	
Naphtha	172- 175 (cif)	n.a.

Shipping News

VESSELS DUE IN BOMBAY FOR EXPORT LOADING

Due Date (1)	Steamer's Name & Flag (2)	Agents (3)	Will load for (4)	Appro sailing (5)
7/6	Arab Mazin (Saudi)	Depe	Aden; Jeddah	17/6
4/6	L.M. Noble Lady	M.C.S./Silver ship	Singapore; Surabaya; Djakarta; & other Far East Ports. (carting at 19-ID)	9/6
15/6	Sam Houston	Samarth	Singapore (Carting at P/Q-PD)	16/6
4/6	L.M. Noble Lady	Silver Ship	Sydney; Melbourne; Brisbane; Adelaide; Fremantle; Auckland; Wellington; Lyttlton; P Chalmers (Carting at 19-ID)	9/6
15/6	Sam Houston (Voy -55) (Ame)	Samarth	Philadelphia; Baltimore; Norfolk; New Orleans; Houston; Savannah; New York. (Carting at P/Q-PD)	16/6
8/6	Ravidas	S.C.I.	New York; Baltimore; Savannah (Direct) & other Inland Destinations (Carting at Kalamboli CWC)	10/6
7/6	Orient Triumph (Voy-309)	Transworld/ O.S.A.	Los Angeles; Longbeach; San Fransisco, Oakland; Seattle; Vancouver; New York; Boston; Toronto; Montreal; Philadelphia; Norfolk; Baltimore; Charleston; Savannah; Jacksonville; Miami; New Orleans, Houston; (Carting at M-178/180 Cotton Depot for both)	10/6

(1)	(2)	(3)	(4)	(5)
/6	Ville De Dubai (Ger) (Voy-2100)	C.M.A.	Jeddah; Marseilles; Barcelona; Le Havre; Hamburg; Felixstowe; Rotterdam; Antwerp. (Carting at Cotton Avenue CFS)	9/6
/6	Orient Triumph (Voy-309)	Transworld	Djibouti; Hodeidah; Alexandria; Benghazi; Tripoli; Malta; La Spezia; Mersin; Naples; Lamassol; Piraeus; Genoa; Leghorn; Fos; Valencia; and all inland destinations, Jeddah; P. Sudan; Assab; Massawa. (Carting at M-178/180 Cotton Depot)	10/6
0/6	Kalidas	S.C.I.	Colombo; Chittagong	23/6
/6	Ville De Dubai	C.M.A. (Ger)	Colombo (Carting at Cotton Avenue CFS)	9/6
0/6	Kalidas (Nhava Sheva)	S.C.I.	Singapore and other Far East Ports	23/6
0/6	Kalidas (Nhava Sheva)	S.C.I.	Melbourne; Fremantle; Adelaide; Sydney	23/6
/6	Orient Triumph (V -309)	Transworld	Sharjah; Dubai; Abu Dhabi; Ajman; Doha; Kuwait; Damman; Baghdad/ Basrah; Syria; & inland destinations in the Gulf. (Carting M-178/180 C.D.)	10/6
/6	Ville De Dubai	C.M.A.	Dubai; Mina Qabbos (Carting at Cotton Avenue CFS)	9/6
3/6	Mowlavi	J.M. Baxi	Bandar Abbas	16/6
/6	Orient Triumph (V -309)	Transworld	Monrovia; Lome; Lagos; Douala; Tema; Takordi; Abidjan: San Pedro (Carting at M-178/180 Cotton Depot)	10/6

VESSELS DUE IN BOMBAY FOR IMPORT DISCHARGE

ue Date	Steamer's Name	Agents	From
/6	Diana (V-Th 29)	Choice	S. America
/6	Ind. Fortune	I.S.S.Co.	U.K. Cont.
2/6	Jala Murugan	S.C.I.	U.K. Cont.
3/6	Kabirdas	S.C.I.	U.K. Cont./U.S.
0/6	S/o. Manipur	S.C.I.	U.S. Canada
6/6	S/o. Gujarat	S.C.I.	U.K. Cont.
7/6	Scotian Express	S.C.I.	U.K. Cont.
0/6	Antje	Sai ship	U.K. Cont.
9/6	Diana (V-Th 29)	Choice	S. America
2/6	Richmond (V.Th-23)	Choice	S. America

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(19) SODIUM FLUORIDE
(20) AMMONIUM BIFLUORIDE
(21) AMMONIUM FLUORIDE
(22) SODIUM SULPHATE
(23) FLUOBORIC ACID
(24) LEAD FLUOBORATE
(25) COBALT SULPHATE
(26) SULPHURIC ACID

Materials Imported

MADRAS
(From 20.3.89 to 31.3.89)

SODIUM ALGINATE: From UK: Rockweld Electronics Pvt. Ltd., 50 Kgs., Rs. 7,935.

SODIUM METAL: From Japan: Akai Impex Pvt. Ltd., 15,470 Kgs., Rs. 5,18,182.

SODIUM FORMATE: From Spain: Tamilnadu Chemical Products Ltd., 200 MTs., Rs. 8,37,398.

STRONTIUM CARBONATE: From UK: Rockweld Electronics I Ltd., 25 Kgs., Rs. 859.

SULPHUR: From Kuwait: MMTC Ltd., 2,000 MTs., Rs. 40,56,699.

TANTALUM OXIDE: From FRG: Widia (India) Limited, 250 Kgs., Rs. 5,07,685.

TETRAETHYL AMMONIUM BROMIDE: From USA: IEL Ltd., 2,045.45 Kgs., Rs. 2,65,026.

TETRAHYDROFURAN: From FRG; Prakash Pipes & Inds. Ltd., 14,040 Kgs., RS. 5,42,876; From Japan: Glindia Ltd., 14,400 Kgs., Rs. 4,63,939.

THIONYL CHLORIDE: From FRG: I.E.L. Ltd., 16,800 Kgs., Rs. 1,83,330.

THIOUREA: From Japan: I.E.L. Ltd., 7 MTs., Rs. 2,13,156.

TITANIUM DIOXIDE: From Switzerland: Vijay Paints & Pigments, 140 Kgs., Rs. 14,064.

TITANIUM DIOXIDE RUTILE: From Japan: Addisons Paints & Chemicals, 17.5 MTs., Rs. 6,67,236.

TOLUENE: From USA: Elgi Polytex Ltd., 14,000 Kgs., Rs. 1,50,258.

TRICHLOROETHANE: From UK: HAL, 1,200 Kgs, Rs. 61,190.

TRICHLOROETHYLENE: From UK: Brakes India Ltd., 22,192 Kgs., Rs. 2,54,623.

TRIMETHOXY BENZALDEHYDE: From Netherlands: Inventaa Chemicals Pvt. Ltd., 5,040 Kgs., Rs. 1,73,814.

XYLENE: From Singapore: Addisons Paints & Chemicals, 45.466 MTs., Rs. 5,07,634.

DYE MATERIALS IMPORTED
MADRAS
(From 20.3.89 to 31.3.89)

DYESTUFFS: From FRG: Coromandel Leathers Pvt. Ltd., 25 Kgs., Rs. 5,036.

SAVINYL BLACK: From Switzerland: Chemcrown India Ltd., 200 Kgs., Rs. 1,19,348.

SAVINYL BLUE: From Switzerland: Chemcrown India Ltd., 10 Kgs., Rs. 4,986.

SAVINYL BROWN: From Switzerland: Chemcrown India Ltd., 100 Kgs., Rs. 63,450.

LUGANIL BROWN: From FRG: Zam Zam Traders, 1,150 Kgs., Rs. 2,52,961.

SAVINYL FIRE RED: From Switzerland: Chemcrown India Ltd., 50 Kgs., Rs. 45,322.

SAVINYL ORANGE: From Switzerland: Chemcrown India Ltd., 50 Kgs., Rs. 29,838.

SAVINYL PINK: From Switzerland: Chemcrown India Ltd., 10 Kgs., Rs. 8,560.

SAVINYL RED: From Switzerland: Chemcrown India Ltd., 50 Kgs., Rs. 32,732.

SAVINYL YELLOW: From Switzerland: Chemcrown India Ltd., 75 Kgs., Rs. 33,614.

DRUG MATERIALS IMPORTED
MADRAS
(From 20.3.89 to 31.3.89)

ALPHA PHENYL GLYCINE: From China: TTK Chemicals Ltd., 3,000 Kgs., Rs. 7,53,658.

D(-)ALPHA PHENYL GLYCINE CHLORIDE: From Netherlands: Agipi Chemicals, 4.69 MTs., Rs. 16,53,077.

D(-)ALPHA PHENYL GLYCINE CHLORIDE HCL: From Italy: Tamilnadu Dadha Pharmaceuticals Ltd., 140 Kgs., Rs. 63,290.

CARBAMAZEPINE BP 80: From Hong Kong: Shiyal Chemicals (Madras) 100 Kgs., Rs. 1,11,983.

CHLORPHENIRAMINE MALEATE: From Japan: Tamilnadu Dadha Pharmaceuticals Ltd., 125 Kgs., Rs. 91,907.

CHOLESTEROL USP: From Japan: Datpro International, 500 Kgs., Rs. 3,02,203.

DEXAMETHASONE: From France: Medopharm, 1 Kg., Rs. 42,300.

ERYTHROMYCINE THIOCYANATE: From USA: Pradeep Drug Co. Ltd., 2,052.58 Kgs., Rs. 24,68,860.

HYDROXY PHENYL GLYCINE: From Netherlands: SOL Pharmaceuticals Ltd., 500 Kgs., Rs. 1,64,435.

MORPHOLINE: From GDR: Inventaa Chemicals Pvt. Ltd., 15,600 Kgs., Rs. 4,77,052.

SALBUTAMOL SULPHATE BP: From Finland: Tablets India Ltd., 45 Kgs., Rs. 1,89,320.

PLASTIC MATERIALS IMPORTED
MADRAS
(From 20.3.89 to 31.3.89)

EPOXY RESIN: From Japan: ACE Components & Electronics Ltd., 60 Kgs., Rs. 7,449.

HDPE: From Japan: Sri Narasimha Plastic Industries Pvt. Ltd., 25,000 Kgs., Rs. 4,41,207; From Saudi Arabia: Peacock Polyester Pvt. Ltd., 1,02,900 Kgs., Rs. 17,62,532; Sunshine Plastic Inds., 24.75 MTs., RS. 3,86,250; From Singapore: Jampex Enterprises, 68 MTs., Rs. 10,47,808; Magnum Enterprises, 68,000 Kgs., Rs. 9,71,913.

PHENOL FORMALDEHYDE: From Korea: Sundaram Abex Ltd., 30,000 Kgs., Rs. 7,56,714.

POLYBUTYL TEREPHTHALATE: From Korea: Godavari Electronics Components, 1,000 Kgs., Rs. 70,037.

POLYPHENYLENE OXIDE: From Netherlands: Easun Reyroll Relays & Device, 1,000 Kgs., Rs. 60,902.

POLYPROPYLENE: From Belgium: Kunal Engineering Co. Ltd., 15 MTs., Rs 3,34,579; From Japan: Kumaragiri Electronics Ltd., 5,966.9 Kgs., Rs. 9,43,303; From Singapore: Eskay Enterprises, 16,000 Kgs., Rs. 2,72,840; From UK: Madura Coats

Ltd., 8,500 Kgs., Rs. 3,02,311.

POLYPROPYLENE RESIN: From Brazil: Everest International Traders, 14,000 Kgs., Rs. 2,30,642.

PVC RESIN: From Korea: Fenner (India) Ltd., 60,000 Kgs., Rs. 12,31,846; United Industrial Plastics Pvt. Ltd., 30,000 Kgs., Rs. 4,87,581.

MATERIALS EXFORTED MADRAS (From 1.3.89 to 6.3.89)

CHLORPHENIRAMINE MALEATE: Gramer Chemicals Pvt. Ltd., 500 Kgs., Rs. 2,63,488.

ULTRAMARINE BLUE: To Saudi Arabia: Ultramarine & Pigments Ltd., 10,500 Kgs., Rs. 2,82,000; To Sri Lanka: Ultramarine & Pigments Ltd., 17,000 Kgs., Rs. 2,47,477.

BRUCINE SULPHATE NF: To USA: Kothari Phyto Chemicals Intl., 852 Kgs., Rs. 5,95,620.

SODIUM HYDROSULPHITE: To Bangladesh: Krishna Overseas Corpn., 20,000 Kgs., Rs. 2,89,292.

IBUPROFEN USP: To USA: Cheminor Drugs Pvt. Ltd., 10,000 Kgs., Rs. 24,75,368.

IBUPROFEN USP XXI BP 80: To USA: Cheminor Drugs Pvt. Ltd., 10,000 Kgs., Rs. 24,75,368.

CAUSTIC SODA FLAKES: To Indonesia: SPIC, 1,04,080 Kgs., Rs. 7,07,261.

MATERIALS IMPORTED MADRAS (From 3.4.89 to 22.4.89)

6 AMINO PENICILLINIC ACID: From FRG: TTK Chemicals, 4,500 Kgs., Rs. 43,85,562.

ACETIC ANHYDRIDE: From FRG: Srinivasa Agro Industries Ltd., 12,500 Kgs., Rs. 2,17,419.

ACETYLENE BLACK: From France: M/s. Indo National Ltd., 28,000 Kgs., Rs. 7,67,361.

ACETYL CHLORIDE: From FRG: Cheminor Drugs (P) Ltd., 15,000 Kgs., Rs. 3,23,239.

ACETONITRILE: From China: Indian Drugs and Pharmaceuticals., 24 MTs., Rs. 3,94,848.

ACRYLONITRILE BUTADIENE From Japan: Taylor Rubber Inds., 6.47 MTs., Rs. 1,31,333.

ALLYL CAPROATE: From UK: Bush Boake Allen India Ltd., 500 Kgs Rs. 1,03,306; Grauer & Weil India Ltd 14,400 Kgs., Rs. 3,73,753.

AMINOPHYLLINE BP 80: From Hong Kong: Kesari Mal, 175 Kgs Rs. 24,779.

AMMONIUM PERSULPHATE From Japan: I.E.L. Ltd., 7,000 Kg Rs. 1,59,546.

ANISALDEHYDE: From UK: Bu Boake Allen India Ltd., 250 Kg Rs. 60,793.

ANTIMONY OXIDE: From Japa Fenner India Ltd., 5 MTs., Rs. 2,46,05

AROMATIC CHEMICALS: Fro USA: Aravinda Parimala Works, 619 Kgs., Rs. 1,90,961; From Franc Bharat Industrial Corpn., 3,000 Kg Rs. 5,32,869; From Japan: Ambi Chemical Products, 1,000 Kg Rs. 1,77,377.

BARBITURIC ACID: From FR Babros Chemicals Pvt. Ltd., 400 Kg Rs. 56,334.

BIO CHEMICALS: From US National Institute of Mental Health, Nos., Rs. 13,858.

BUTYL GLYCIDYL ETHER: Fr Japan: SIP Resins Ltd., 1,080 Kg Rs. 65,774.

BUTYRIC ACID: From FRG: Bu Boake Allen India Ltd., 3,000 Kg Rs. 76,818.

CAPROIC ACID: From UK: Bu Boake Allen (I) Ltd., 180 Kg Rs. 17,264.

CAPROLACTUM: From Neth lands: Shriram Fibres Ltd., 410 MT Rs. 1,21,80,544.

CHLORO ACETYL CHLORI From Switzerland: Siris India L 16,500 Kgs., Rs. 4,24,215.

2 CHLORO METHYL PROP NATE: From UK: Dr. Reddy's Lal atories Ltd., 16,650 Kgs., Rs. 5,75,

CHROMIUM DIOXIDE: F USA: Prakash Pipes Inds., Ltd., Kgs., Rs. 2,00,976.

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CINNAMIC ALCOHOL: From FRG: The Mysore Agarbathi Mfg. Co. P. Ltd., 1 MT, Rs. 1,15,140.

CITRIC ACID: From China: Nippon Trading Co., 17,500 Kgs., Rs. 2,44,831.

COUMARIN: From France: Mysore State Agarbathi Mfrs., 2,000 Kgs., Rs. 4,90,259; Padmini Products, 1,000 Kgs., Rs. 2,68,793.

CYCLOHEXANONE: From FRG: Prakash Pipes & Inds., 29,640 Kgs., Rs. 7,00,377.

CYANO PYRIDINE: From Japan: Chemolak Laboratories (P) Ltd., 2,500 Kgs., Rs. 1,81,160; Manson Drugs Ltd., 4,000 Kgs., Rs. 3,08,090.

CIMETIDINE USP: From Australia: Astra IDL Ltd., 400 Kgs., Rs. 2,48,739.

D(-)ALPHA PHENYL GLYCINE BASE: From China: TTK Chemicals Ltd., 3,000 Kgs., Rs. 7,53,658.

D(-)PARA HYDROXY PHENYL GLYCINE: From Singapore: Aurobindo Pharma Ltd., 500 Kgs., Rs. 1,57,189; From Netherlands: 500 Kgs., Rs. 1,60,638.

DEXTRO METHORPHAN HYDRO BROMIDE: From Switzerland: The Mysore Pharmaceuticals, 5 Kgs., Rs. 24,619.

DIAZEPAM BP 80: From China: Medopharm, 104 Kgs., Rs. 43,545.

DIETHYL ANILINE: From Switzerland: Siris India Ltd., 29.64 MTs., Rs. 12,77,982.

DIMETHYL ACETAMIDE: From FRG: TTK Chemicals Ltd., 1,140 Kgs., Rs. 31,521.

DIMETHYL OCTANOL: From UK: Reliable Industrial Syndicate, 1,000 Kgs., Rs. 1,37,029.

DIPROPYLENE GLYCOL: From Hong Kong: Brakes India Ltd., 16,202 Kgs., Rs. 3,18,346.

DURSBAN F (CHLOROPYRIFOS): From USA: Coromandel Indag Products, 17,010 Kgs., Rs. 26,05,698.

EPICHLOROHYDRINE: From Japan: Sri Venkateswara Chemicals, 1,400 Kgs., Rs. 72,508; Synthokem, 1,120 Kgs., Rs. 83,373.

EPOXIDE RESIN: From FRG: Kothari Electronics & Inds., 1,07,710 Kgs., Rs. 4,94,380; From Japan: ECP Ltd., 2,680 Kgs., Rs. 1,65,844.

ERYTHROMYCINE THIOCYANATE: From USA: Tamilnadu Dadha Pharmaceuticals, 500 Kgs., Rs. 5,81,919.

ETHYL ACETATE: From FRG: Pradeep Drug Co., 31,920 Kgs., Rs. 4,85,096.

ETHYL BUTYRATE: From UK: Bush Boake Allen (I) Ltd., 2,130 Kgs., Rs. 1,11,232.

ETHYLENE VINYL ACETATE: From USA: Dadha Hewlette Finance, 6,000 Kgs., Rs. 77,650.

FORMYL RIFAMPYCIN: From Italy: Curekraft Chemicals (I) Pvt. Ltd., 199.3 Kgs., Rs. 5,02,704.

FURFURYLAMINE: From FRG: Arandy Laboratories Ltd., 1 MT., Rs. 83,348.

GAMMA FERRIC OXIDE: From FRG: Prakash Pipes & Inds. Ltd., 13,000 Kgs., Rs. 10,21,891.

GUAIACOL: From Japan: Synthokem: 3,000 Kgs., Rs. 2,71,151.

GOLD POTASSIUM CYANIDE: From Hong Kong: Hyderabad Connectronics Ltd., 3 Kgs., Rs. 4,21,626.

GRISEOFULVIN BP/USP: From China: American Remedies (P) Ltd., 240 Kgs., Rs. 24,619.

GUM ROSIN N GRADE: From Hong Kong: Amardeep Chemicals & Pharmaceuticals, 1,800 Kgs., Rs. 1,42,510.

GUM BENZOIN: From Singapore: General Traders, 2,830 Kgs., Rs. 42,722; Sanghvi Amritlal Chunilal, 1,393 Kgs., Rs. 21,029; Medicon Traders, 1,468 Kgs., Rs. 33,980; Sha Shantilal Indermal, 1,419 Kgs., Rs. 23,491.

GUM ROSIN: From Indonesia: Seshasayee Paper & Boards Ltd., 54 MTs., Rs. 4,48,405; Servalakshmi Paper & Board, 18 MTs., Rs. 1,55,146; T.T. Cardboards & Paper Mills Ltd., 18 MTs., Rs. 1,53,744.

HEXAMETHYLENE DIAMINE ADIPATE: From Belgium: Shri Ram Fibres Limited., 35,000 Kgs., Rs. 10,41,826.

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HYDROXYLAMINE SULPHATE: From Japan: Siris Ltd., 35,000 Kgs., Rs. 8,94,870; SOL Pharmaceuticals Ltd., 17,500 Kgs., Rs. 4,54,882; Standard Organics Ltd., 17,500 Kgs., Rs. 4,66,145; 17,500 Kgs., Rs. 4,54,882; Virchor Drugs Pvt. Ltd., 17,500 Kgs., Rs. 4,69,556; From USA: Standard Organics Ltd., 32 MTs., Rs. 9,45,647; From Japan: Kisttone Organics (P) Ltd., 10,000 Kgs., Rs. 2,76,702.

IMIPRAMINE HCL: From Iran: Tamilnadu Dadha Pharmaceuticals, 50 Kgs., Rs. 53,429.

ISO BUTYL BENZENE: From UK: Cheminor Drugs Pvt. Ltd., 27,360 Kgs., Rs. 15,15,275; Kopalle Pharmaceuticals Ltd., 6,840 Kgs., Rs. 3,91,011; Cheminor Drugs Pvt. Ltd., 27,314 Kgs., Rs. 13,22,382.

ISO CYANATE (SUPRASEC) VM 25: From Netherlands: Roloforms Polymer Ltd., 6,795 Kgs., Rs. 2,93,630; From UK: Roloforms Polymer Ltd., 6,975 Kgs., Rs. 2,76,868.

ISO PROPYL ALCOHOL: From China: Venkatarama Chemicals Ltd., 25,600 Kgs., Rs. 2,68,564; Shasun Drugs, 25,600 Kgs., Rs. 2,50,691; Cheminor Drugs Ltd., 38,400 Kgs., Rs. 3,80,151.

ITACONIC ACID: From Japan: Dinesh & Co., 1,000 Kgs., Rs. 53,289.

L-LYSINE MONO HCL: From Korea: SKM's Energy Animal Feeds Ltd., 2,000 Kgs., Rs. 1,27,894; From Japan: Komarla Feeds, 1,000 Kgs., Rs. 65,469; From Korea: Sunnex Commercial (P) Ltd., 1,000 Kgs., Rs. 65,353.

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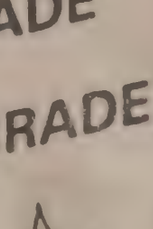

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L-LYSINE MONO HCL USP: Fr Korea: Citadel Fine Pharmaceuticals Ltd., 1,000 Kgs., Rs. 91,353.

LEVAMISOLE HCL BP: Fr China: Alved Products, 200 Kg Rs. 1,06,882.

LDPE: From Japan: High Ener Batteries (I) Ltd., 1,000 Kg Rs. 21,392.

2,6-LUTIDINE: From Japan: TT Chemicals Ltd., 1,080 Kgs Rs. 2,13,765.

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2 MERCAPTOBENZIMIDAZOLE From Japan: Shri Ram Fibres Ltd 2,000 Kgs., Rs. 3,51,972.

2-MERCAPTO-5-NITRO BENZI MIDAZOLE: From USA: Indian Insti tute of Technology, 18 Nos., Rs. 3,119

METHYL ACETO ACETATE From Japan: Vani Organics Pvt. Ltd 16,000 Kgs., Rs. 4,10,377.

METHYL ETHYL KETONE: From Netherlands: Kedarnath Kisanchand 6,600 Kgs., Rs. 1,15,100.

METHYL GLYCOL: From FRG SIP Resins Ltd., 15,010 Kgs. Rs. 2,50,256.

MOLYBDIC OXIDE: From UK Visweswaraya Iron & Steel Ltd., 18,000 Kgs., Rs. 13,72,359.

MONOMETHYL ACETOACETAMIDE: From USA: Vantech Pesticides Ltd., 5 Kgs., Rs. 193.

MORPHOLINE: From UK: Aryl Chemicals, 8.19 MTs., Rs. 1,54,485; Inventaa Chemicals Pvt. Ltd., 11,130 Kgs., Rs. 3,53,453.

NICKEL CHLORIDE: From UK: Wheels India Ltd., 1,000 Kgs., Rs. 71,990.

OCTAMINE: From Thailand: Fenner (India) Ltd., 1,000 Kgs., Rs. 64,709.

ORTHO AMINO BENZENETHIOL: From USA: Globe Organics Ltd., 22 Lbs., Rs. 3,089.

ORPHENADRINE HCL BP 80: From Switzerland: Tamilnadu Dadha Pharmaceuticals Ltd., 100 Kgs., Rs. 1,02,167.

PARA HYDROXY PHENYL GLYCINE: From Singapore: Aurobindo

harma Ltd., 1,000 Kgs., Rs. 3,26,167.

PARA HYDROXY ACETOPHENONE: From FRG: Neuland Laboratories Ltd., 1,600 Kgs., Rs. 4,14,752.

PARAFFIN WAX: From FRG: Vidia India Ltd., 2,500 Kgs., Rs. 43,715; From USA: Indicare Ltd., 0.908 MTs., Rs. 22,204.

PENICILLIN G POTASSIUM: From Japan: TTK Chemicals Ltd., 1,896 Kgs., Rs. 7,94,607.

PENTAERYTHRITOL: From Sweden: IDL Chemicals Ltd., 35 MTs., Rs. 8,84,123.

POLYOL: From UK: Roloforms Polymer Ltd., 9,870 Kgs., Rs. 2,51,327.

POLYVINYL ALCOHOL: From Japan: Chemicals & Plastics India, 80 Kgs., Rs. 3,931.

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POLY BUTYLENE TEREPHTHALATE: From Japan: Electronic Research Ltd., 1,500 Kgs., Rs. 1,11,699.

POLYETHYLENE POWDER: From UK: Southern Petrochemicals Inds., 2 Nos., Rs. 550.

POLYPROPYLENE: From Belgium: Nidhi Plastics Pvt. Ltd., 96.9 MTs., Rs. 15,12,568; From USA: National Products, 34 MTs., Rs. 5,42,458; From Belgium: Nidhi Plastics Ltd, 11,000 Kgs., Rs. 1,71,706.

POLYPROPYLENE RESIN: From France: MM Rubber Co. Ltd., 5 MTs., Rs. 91,930.

POLYPROPYLENE MOULDING POWDER: From Korea: Godavari Electronics, 1,000 Kgs., Rs. 47,351.

POLYSTYRENE RESIN: From Sri Lanka: G.M. Pens (P) Ltd., 7,000 Kgs., Rs. 1,59,271.

POLYVINYL ALCOHOL: From Japan: Peroxides India Ltd., 2,000 Kgs., Rs. 1,32,038; Chemicals & Plastics (I) Ltd., 45 Kgs., Rs. 1,857.

PREDNISOLONE USP: From USA: Medopharm, 50 Kgs., Rs. 6,09,163.

PROPYL ALCOHOL: From China: Cheminor Drugs Pvt. Ltd., 102,400 Kgs., Rs. 10,13,734.

PROPYLENE GLYCOL: From Singapore: Veeyor Formulations, 5,160 Kgs., Rs. 1,15,247.

PROPYLENE GLYCOL USP: From USA: Muthu Meena Agencies, 8.385 MTs., Rs. 1,67,885.

PROPYLENE OXIDE: From FRG: Neuland Laboratories Ltd., 1,034 Kgs., Rs. 67,434.

PROPANTHELINE BROMIDE BP 80: From China: Alfred Berg & Co. India Private Limited, 25 Kgs., Rs. 23,839.

PYRIDINE PURE: From Japan: Vogel Laboratories Pvt. Ltd., 1,950 Kgs., Rs. 1,34,126.

SALBUTAMOL SULPHATE: Tablets India Ltd., 15.2 Kgs., Rs. 63,942; From Finland: Tablets (India) Ltd., 4.8 Kgs., Rs. 20,209.

SELENIUM DIOXIDE: From FRG: T.P.S. Laboratories Pvt. Ltd., 250 Kgs., Rs. 1,06,698.

SILICON RESIN: From France: Laksh anan Isola Limited, 500 Kgs., Rs. 1,07,462.

SILICON CARBIDE CARBOREX -BW: From GDR: Carborandum Universal Limited, 2,000 Kgs., Rs. 42,755.

SODIUM BORATE CRUDE: From Turkey: Bhansali Chemicals Mfg., 150 MTs., Rs. 7,15,026; State Trading Corpn. of India, 500 MTs., Rs. 20,70,104.

SODIUM HYDROXIDE SOLUTION: FROM FRG: SPIC Ltd., 88.46 Kgs., Rs. 580.

SODIUM FORMATE: From Sweden: Tamil Nadu Chemical Products, 126 MTs., Rs. 6,73,396.

SODIUM HYDRIDE: From Switzerland: Majestic Enterprises Private Limited, 21 Kgs., Rs. 17,755.

SODIUM METHOXIDE: From FRG: Dr. Reddy's Laboratories Limited, 9,600 Kgs., Rs. 4,42,724; Inventaa Chemicals Private Limited, 38,400 Kgs., Rs. 18,02,180.

SODIUM FORMATE: From Spain: Vikas Udhyog, 10,000 Kgs., Rs. 41,032.

SULPHUR: From Saudi Arabia: The M.M.T.C of India Ltd., 2,000 MTs., Rs. 43,17,844; From Kuwait: EID Parry Inds. Ltd., 2,000 MTs., Rs. 43,17,697.

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